# BUSH HOG®

# BACKHOES

# Operator's Manual

**MODELS 665H / 765H / 865H / 965H**

**ASSEMBLY • OPERATION • MAINTENANCE**

801 $4.00 50034063

# CONGRATULATIONS!

You have invested in the best implement of its type on the market today.

The care you give your Bush Hog implement will greatly determine your satisfaction with its performance and its service life. We urge a careful study of this manual to provide you with a thorough understanding of your new implement before operating, as well as suggestions for operation and maintenance.

If your manual should become lost or destroyed, Bush Hog will be glad to provide you with a new copy. Order from Bush Hog, P. O. Box 1039, Selma, Alabama 36702-1039.

As an authorized Bush Hog dealer, we stock genuine Bush Hog parts which are manufactured with the same precision and skill as our original equipment. Our trained service personnel are well informed on methods required to service Bush Hog equipment, and are ready and able to help you.

Should you require additional information or assistance, please contact us.

YOUR AUTHORIZED
BUSH HOG DEALER

BECAUSE BUSH HOG MAINTAINS AN ONGOING PROGRAM OF PRODUCT IMPROVEMENT, WE RESERVE THE RIGHT TO MAKE IMPROVEMENTS IN DESIGN OR CHANGES IN SPECIFICATIONS WITHOUT INCURRING ANY OBLIGATION TO INSTALL THEM ON UNITS PREVIOUSLY SOLD.

BECAUSE OF THE POSSIBILITY THAT SOME PHOTOGRAPHS IN THIS MANUAL WERE TAKEN OF PROTOTYPE MODELS, PRODUCTION MODELS MAY VARY IN SOME DETAIL. IN ADDITION, SOME PHOTOGRAPHS MAY SHOW SHIELDS REMOVED FOR PURPOSES OF CLARITY. **NEVER OPERATE** THIS IMPLEMENT WITHOUT ALL SHIELDS IN PLACE.

# BACKHOES
# Operator's Manual

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## RETAIL CUSTOMER'S RESPONSIBILITY UNDER THE BUSH HOG WARRANTY

**It is the Retail Customer and/or Operator's responsibility to read the Operator's Manual, to operate, lubricate, maintain, and store the product in accordance with all instructions and safety procedures. Failure of the operator to read the Operator's Manual is a misuse of this equipment.**

**It is the Retail Customer and/or Operator's responsibility to inspect the product and to have any part(s) repaired or replaced when continued operation would cause damage or excessive wear to other parts or cause a safety hazard.**

**It is the Retail Customer's responsibility to deliver the product to the authorized Bush Hog dealer from whom he purchased it, for service or replacement of defective parts which are covered by warranty. Repairs to be submitted for warranty consideration must be made within forty-five (45) days of failure.**

**It is the Retail Customer's responsibility for any cost incurred by the Dealer for traveling to or hauling of the product for the purpose of performing a warranty obligation or inspection.**

## UNDERSTAND SIGNAL WORDS

**DANGER:** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

**WARNING:** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION:** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

# BUSH HOG®
# LIMITED WARRANTY

Bush Hog warrants to the original purchaser of any new Bush Hog equipment, purchased from an authorized Bush Hog dealer, that the equipment be free from defects in material and workmanship for a period of one (1) year for non-commercial, state, and municipalities' use and ninety (90) days for commercial use from date of retail sale. The obligation of Bush Hog to the purchaser under this warranty is limited to the repair or replacement of defective parts.

Replacement or repair parts installed in the equipment covered by this limited warranty are warranted for ninety (90) days from the date of purchase of such part or to the expiration of the applicable new equipment warranty period, whichever occurs later. Warranted parts shall be provided at no cost to the user at an authorized Bush Hog dealer during regular working hours. Bush Hog reserves the right to inspect any equipment or parts which are claimed to have been defective in material or workmanship.

## DISCLAIMER OF IMPLIED WARRANTIES & CONSEQUENTIAL DAMAGES

Bush Hog's obligation under this limited warranty, to the extent allowed by law, is in lieu of all warranties, implied or expressed, **INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE** and any liability for incidental and consequential damages with respect to the sale or use of the items warranted. Such incidental and consequential damages shall include but not be limited to: transportation charges other than normal freight charges; cost of installation other than cost approved by Bush Hog; duty; taxes; charges for normal service or adjustment; loss of crops or any other loss of income; rental of substitute equipment, expenses due to loss, damage, detention or delay in the delivery of equipment or parts resulting from acts beyond the control of Bush Hog.

## THIS LIMITED WARRANTY SHALL NOT APPLY:

1. To vendor items which carry their own warranties, such as engines, tires, and tubes.
2. If the unit has been subjected to misapplication, abuse, misuse, negligence, fire or other accident.
3. If parts not made or supplied by Bush Hog have been used in connection with the unit, if, in the sole judgement of Bush Hog such use affects its performance, stability or reliability.
4. If the unit has been altered or repaired outside of an authorized Bush Hog dealership in a manner which, in the sole judgement of Bush Hog, affects its performance, stability or reliability.
5. To normal maintenance service and normal replacement items such as gearbox lubricant, hydraulic fluid, worn blades, or to normal deterioration of such things as belts and exterior finish due to use or exposure.
6. To expendable or wear items such as teeth, chains, sprockets, belts, springs and any other items that in the company's sole judgement is a wear item.

NO EMPLOYEE OR REPRESENTATIVE OF BUSH HOG IS AUTHORIZED TO CHANGE THIS LIMITED WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY UNLESS SUCH CHANGE IS MADE IN WRITING AND SIGNED BY BUSH HOG'S SERVICE MANAGER, POST OFFICE BOX 1039, SELMA, ALABAMA 36702-1039.

Record the model number, serial number and date purchased. This information will be helpful to your dealer if parts or service are required.

MAKE CERTAIN THE WARRANTY REGISTRATION CARD HAS BEEN FILED WITH BUSH HOG/ SELMA, ALABAMA

MODEL NUMBER _____

SERIAL NUMBER _____

DATE OF RETAIL SALE _____

# DEALER PREPARATION CHECK LIST

**665H - 765H - 865H - 965H BACKHOES**

BEFORE DELIVERING MACHINE - The following check list should be completed.
Use the Operator's Manual as a guide.

- ❑ Machine properly assembled.
- ❑ All safety decals readable (See decal page).
- ❑ All bolts tightened to torque specifications given in the torque chart.
- ❑ Machine operates properly.
- ❑ Operators manual has been delivered to owner and he has been instructed on the safe and proper use of the backhoe.

Dealer's Signature _____

⚠ **CAUTION:**

It is recommended that the tractor be equipped with Rollover Protection System (ROPS) and seat belt be used for all implement operations.

THIS CHECKLIST TO REMAIN IN OWNER'S MANUAL

.

It is the responsibility of the dealer to complete the procedures listed above before delivery of this implement to the customer.

# IMPORTANT SAFETY PRECAUTIONS

**This symbol is used to call attention to safety precautions that should be followed by the operator to avoid accidents. When you see this symbol, carefully read the message that follows and heed its advice. Failure to comply with safety precautions could result in serious bodily injury.**

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel in the operation, transport, maintenance and storage of equipment. Lack of attention to safety can result in accident, personal injury, reduction of efficiency and worst of all—loss of life. Watch for safety hazards and correct deficiencies promptly. Use the following safety precautions as a general guide to safe operations when using this machine. Additional safety precautions are used throughout this manual for specific operating and maintenance procedures. Read this manual and review the safety precautions often until you know the limitations.

## THE TRACTOR

1. Read the tractor operator's manual to learn how to operate your tractor safely. Failure to do so could result in serious injury or death and equipment damage.
2. It is recommended that tractor be equipped with Rollover Protective System (ROPS) and a seat belt be used for all loader operations.
3. Add wheel ballast or front weight for stability.
4. Move wheels to the tractor manufacturer's widest recommended settings to increase stability.
5. For better stability, use tractor with wide front axle rather than tricycle front wheels.
6. Move and turn the tractor at low speeds.
7. Stop tractor engine, place transmission in park (or neutral), engage parking brake, lower loader arms to ground, cycle all hydraulic controls to relieve pressure, allow machine moving parts to stop, remove ignition key to prevent unauthorized person from starting engine before dismounting tractor or serving, repairing, or making adjustments to the equipment.
8. Wear personal protective equipment (PPE), such as, but not limited to, protection for eyes, ears, lungs, head, hands and feet when operating, servicing, or repairing equipment. Avoid wearing loose clothing or jewelry that may catch and entangle on equipment moving parts.

## THE BACKHOE

1. DO NOT operate the backhoe unless it is rigidly attached to the tractor.
2. KNOW your controls. Read this operator's manual and the manual provided with your tractor. Learn how to stop the tractor, the engine and the backhoe quickly in an emergency.
3. PROVIDE adequate front end weight to counter-balance the backhoe at all times. 20% of the total tractor, loader and backhoe weight must be on the tractor front axle. If unsure of weight distribution, determine at a weight scale. Total vehicle weight , including backhoe and counter weights, must not exceed the ROPS certificate for gross vehicle weight.
4. BE SURE the area is clear of overhead or underground utilities or other hazards.
5. POSITION a barricade around the work area.
6. KEEP all bystanders a safe distance away.
7. DO NOT attempt to enter operator's platform of backhoe by using the stabilizers as a step.
8. OPERATE from the backhoe operator's seat only.
9. ALLOW only one person to operate the backhoe at any time.
10. DISENGAGE safety locks as shown in Figures 1 & 3 before attempting to operate the backhoe.
11. NEVER dig with the backhoe unless the stabilizers are properly set.

# SAFETY PRECAUTIONS CONTINUED

12. DO NOT dig under stabilizers or tractor backhoe. Soft ground or sandy soil can cause cave-ins.
13. KEEP BUCKET away from the stabilizer area to avoid possible stabilizer damage.
14. ALWAYS swing bucket uphill to dump when on a hillside and keep loaded bucket low.
15. SET BRAKES and block wheels when operating on hills and banks to avoid dangerous runaway.
16. WATCH for overhead wires. DO NOT touch wires with any part of the backhoe.
17. NEVER allow a person to work under a raised bucket.
18. NEVER lift a person with the backhoe.
19. DO NOT use the backhoe as a battering ram. Use the backhoe only for digging.
20. ALWAYS lower the backhoe bucket and stabilizers to the ground, shut off engine, and apply the parking brake before getting off unit, or when not digging.
21. NEVER leave the tractor unattended with the engine running.
22. DO NOT attempt to raise the tractor off the ground or move the tractor forward or backward using the backhoe dipperstick or bucket.

### TRANSPORTATION

1. ALWAYS engage safety locks before transporting backhoe. See Figures 1 & 3.
2. DO NOT drive the tractor near the edge of a ditch or excavation.
3. ALWAYS use accessory lights and devices when transporting on a road or highway to warn operators of other vehicles. Check your local government regulations.
4. BE SURE the SMV emblem is visible to the rear.

### ADJUSTMENTS AND INSPECTION

1. CHECK pins that attach backhoe to tractor and all pivot pins for tightness several times daily. Replace any parts that are bent, broken or missing.
2. ALWAYS engage safety locks before servicing backhoe. See Figures 1 & 3.
3. DO NOT oil, grease, or adjust the backhoe while it is in motion. For greasing, see Service section for details.
4. DO NOT change any backhoe relief valve settings. They are factory set for best backhoe performance and safety.
5. PROTECT YOUR EYES - WEAR SAFETY GLASSES.
6. GUARD AGAINST INJURY when driving connecting pins or performing any repair in which particles can chip from work piece or striking tool.
7. DO NOT remove any guards on backhoe or tractor.

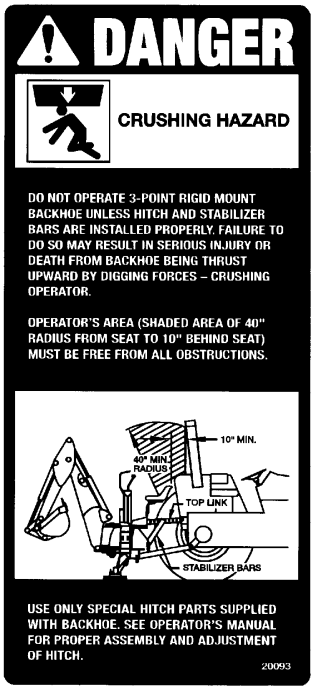
### AVOID HIGH-PRESSURE FLUIDS

ESCAPING fluid under pressure can have sufficient force to penetrate the skin and cause serious injury. Be sure to stop engine and relieve all pressure before disconnecting lines. Be sure all connections are tight and that lines, pipes, and hoses are not damaged before applying pressure to the system. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood - not your hands-to search for suspected leaks.

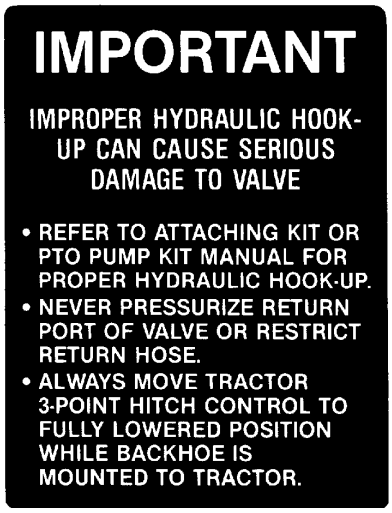
SEE A DOCTOR at once if injured by escaping fluid. Serious infection or gangrene can develop if proper medical treatment is not administered immediately.

# SAFETY DECALS

The safety of the operator was a prime consideration in the design of the backhoe. Proper shielding, convenient controls, simple adjustments and other safety features have been built into this implement. The following decals are located on the backhoe. Keep decals clean and replace them immediately if they are missing. Contact your dealer or Bush Hog for replacements.

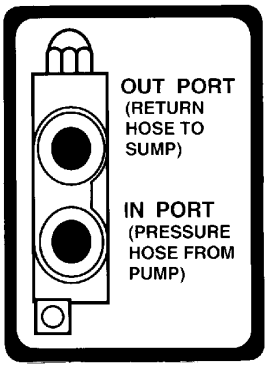



Location: Left Side of Control Tower




Location: Left Side Toe Shield Area

Location: Right Side Of Control Tower




Location: Toe Shield Area

665H BACKHOE

765H BACKHOE

865H BACKHOE

965H BACKHOE

Location: Right Side Of Control Tower

# IMPORTANT FEDERAL LAWS AND REGULATIONS* CONCERNING EMPLOYERS, EMPLOYEES AND OPERATIONS.

*(This section is intended to explain in broad terms the concept and effect of the following federal laws and regulations. It is not intended as a legal interpretation of the laws and should not be considered as such).

U.S. Public Law 91-596 (The Williams-Steiger Occupational and Health Act of 1970) OSHA

**This Act Seeks:**
"...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources..."

DUTIES

Sec. 5 (a) Each employer—
(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
(2) shall comply with occupational safety and health standards promulgated under this Act.
(b) Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.

**OSHA Regulations**

Current OSHA regulations state in part: "At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be involved." These will include (but are not limited to) instructions to:

Keep all guards in place when the machine is in operation;

Permit no riders on equipment;

Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment.

Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine.

## EMPLOYEE TRACTOR OPERATING INSTRUCTIONS:

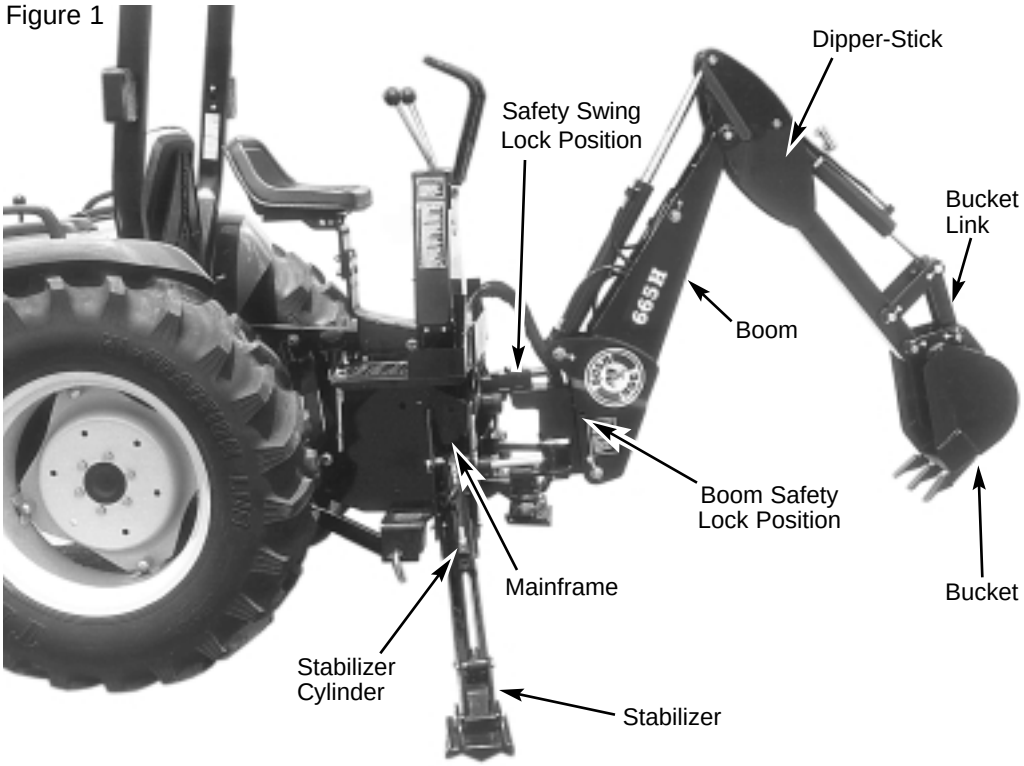
1. Securely fasten your seat belt if the tractor has a ROPS.
2. Where possible, avoid operating the tractor near ditches, embankments, and holes.
3. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
4. Stay off slopes too steep for safe operation.
5. Watch where you are going, especially at row ends, on roads, and around trees.
6. Do not permit others to ride.
7. Operate the tractor smoothly - no jerky turns, starts, or stops.
8. Hitch only to the drawbar and hitch points recommended by tractor manufacturers.
9. When tractor is stopped, set brakes securely and use park lock if available.

**Child Labor Under 16 Years Old**

Some regulations specify that no one under the age of 16 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102.)

# GENERAL OPERATION

Figure 1



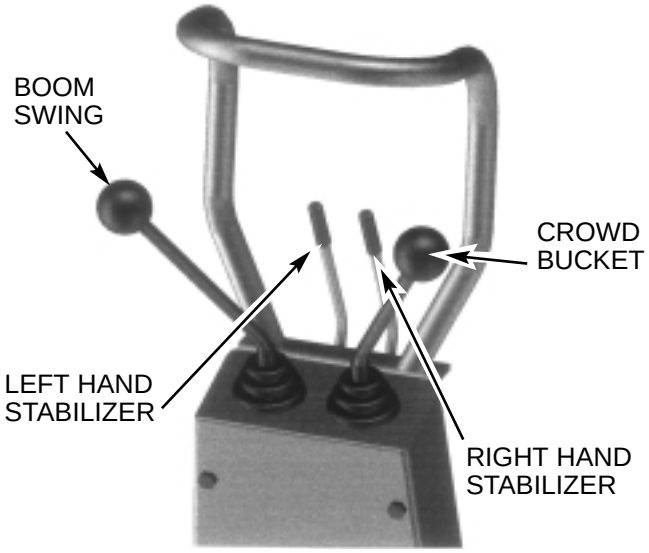

**⚠ CAUTION ⚠**

**To avoid the possible injury, observe the following safety rules BEFORE OPERATING the backhoe:**
**1. BE SURE area is clear of underground utilities or other hazards.**
**2. POSITION barricade around work area.**
**3. PROVIDE adequate front end weight to counter-balance tractor at all times. 20% of the total tractor, loader and backhoe weight must be on the tractor front axle.**
**4. Keep bystanders a safe distance away.**

DIRECTIONS: The terms right, left, front and back shall be determined from the position of the operator when seated in the operating position on the backhoe.

**ENGINE SPEED**
The speed at which the backhoe operates is partially dependent on engine RPM. Use a moderate engine speed to start and increase it as your experience permits. Refer to "SPECIFICATIONS" for hydraulic flow volume requirements. When powering from tractor systems with higher output, reduce engine RPM to obtain acceptable backhoe operating speed.

Figure 2 Control Handles




**CONTROLS**
The backhoe has two major control levers plus the stabilizer control levers. These controls are located on the control panel directly ahead of the operator. See Figure 2. The following is a list of the controls, with the function of each, reading from left to right.

**1. Boom/Swing:** Push lever forward, the boom moves down, away from the operator. Pull lever back, the boom moves up, toward the operator.

The Boom/Swing Control Lever has an added "float" function. A detent or stop should be felt when the lever is pushed forward to move the boom down. Pushing the lever forward more will overcome the detent and cause the boom to float, or move down or up freely, depending on the forces acting on it. When the lever is released it should return to the center, neutral position.

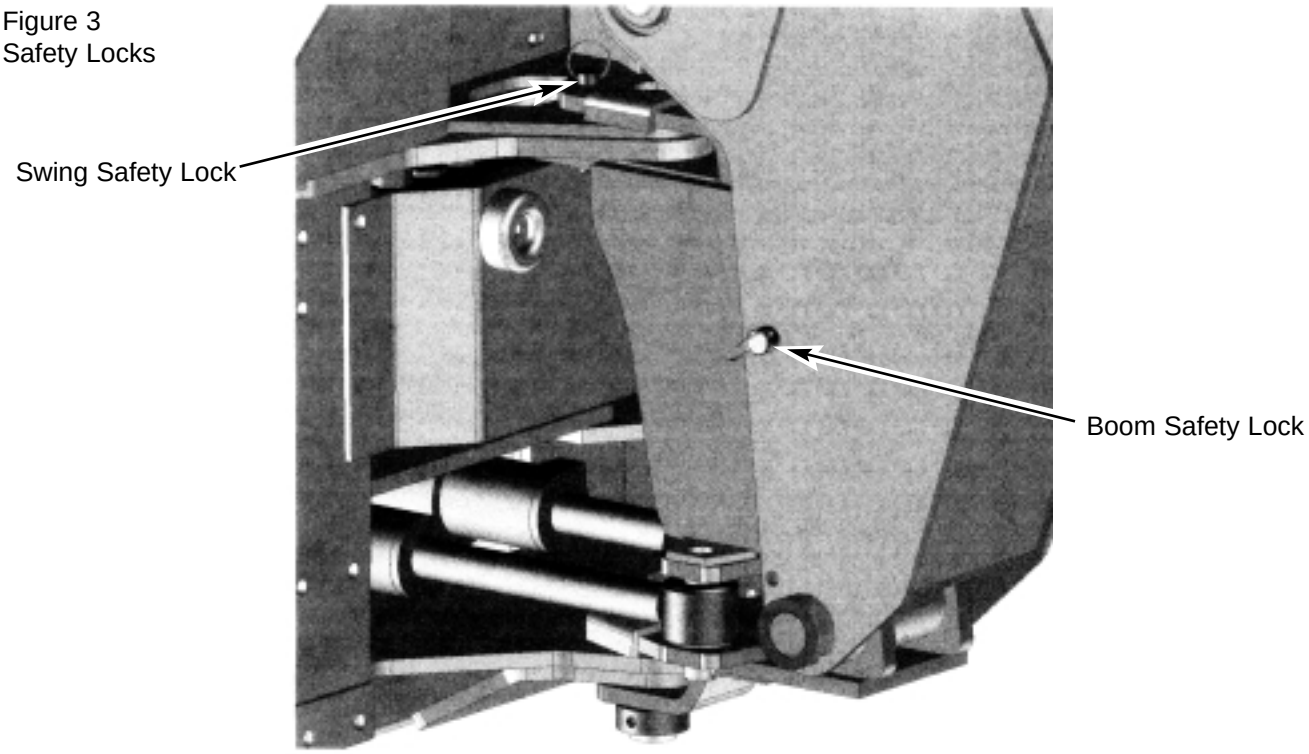
Move lever to the left, the backhoe swings to the left. Move lever to the right, the backhoe swings to the right.

By moving the lever to one of the intermediate positions, the boom can be swung left or right at the same it is being raised or lowered, performing the two operations simultaneously.

SWING LEFT AND LOWER the boom by moving the control lever forward and to the left.

SWING LEFT AND RAISE the boom by moving the control lever back and to the left.

Figure 3
Safety Locks




SWING RIGHT AND LOWER the boom by moving the lever forward and to the right.

SWING RIGHT AND RAISE the boom by moving the lever back and to the right.

**2. Left Hand Stabilizer:** Push lever forward, the LH stabilizer lowers. Pull lever back, the LH stabilizer raises.

**3. Right Hand Stabilizer:** Push lever forward, the RH stabilizer lowers. Pull lever back, the RH stabilizer raises.

**4. Crowd/Bucket:** Push lever forward, the dipperstick moves out, away from the operator. Pull lever back, the dipperstick moves in, toward the operator.

Move lever to left, the bucket curls in. Move lever to right, the bucket extends out.

By moving the lever to one of the intermediate positions, the dipperstick can be extended or retracted at the same time the bucket is being loaded or dumped.

EXTEND AND LOAD the bucket by moving the lever forward and to the left.

RETRACT AND LOAD the bucket by moving the lever back and to the left.

EXTEND AND DUMP the bucket by moving the lever forward and to the right.

RETRACT AND DUMP the bucket by moving the lever back and to the right.

The two operations of the boom lever, combined with the two operations performed by the bucket and dipperstick control lever, provide four simultaneous operations from the two levers, keeping cycle time to a minimum.

In general, the direction of movement of a control lever corresponds to the movement of the operating member.

**Operating the Backhoe**

**⚠ CAUTION ⚠**

**To avoid possible injury, observe the following safety rules WHEN OPERATING the backhoe.**

**1. DISENGAGE safety locks as shown in Figure 3 before attempting to operate the backhoe. Store lockpins in holes provided in operator platform.**

**2. OPERATE from the backhoe operator's seat only.**

**3. LOWER the stabilizers until the rear of the tractor is totally supported by them. NOTE: rear tires should not come up off of the ground. See diagram on Page 11.**

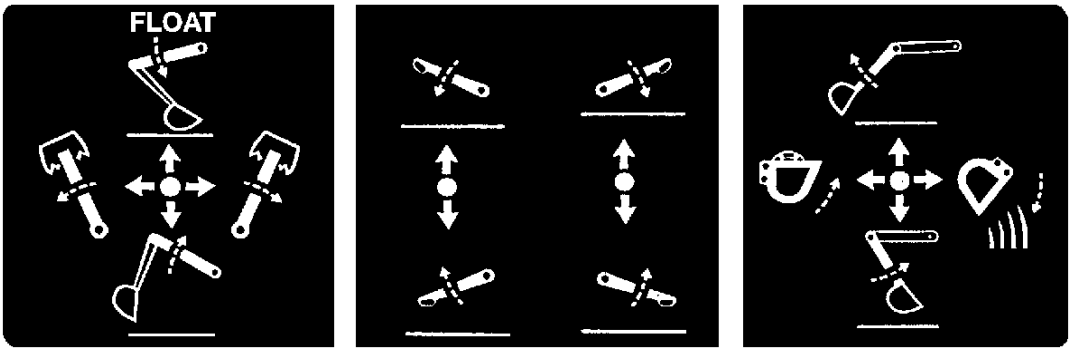
**4. DO NOT dig near the stabilizers.**

**5. DO NOT touch overhead wires with any part of the backhoe.**

**6. DO NOT attempt to raise the tractor off the ground or move the tractor forward or backward using the backhoe dipperstick or bucket.**

**7. DO NOT lose stability by swinging the bucket downhill when positioned on a slope.**

**8. DO NOT lower the backhoe boom using the "float" function. It will freefall, and could result in injury to bystanders or damage to the backhoe.**




Location: Back Of Control Panel

It is not difficult to become an efficient operator. Control lever operating decal is located on back of the control panel. Study this decal. It will assist you in becoming familiar with the controls.

Smooth, light handling of the controls will result in the most efficient backhoe operation.

Operate the backhoe control levers to become familiar with their speed and movements. The engine speed and the size of the hydraulic system will determine the speed of cylinder operation. When powering from tractor systems with higher output than required, reduce engine RPM to obtain acceptable backhoe operating speed.

Swing the boom several times to practice controlling the speed of swing. Do not operate the swing more than 45° each way for the first few times, then gradually increase the arc.

***IMPORTANT: To avoid damage to the backhoe, do not slam swing unit into the rubber bumpers.***

The boom “float” function may be used during digging to eliminate down pressure when cleaning the bottom of a trench. The primary purpose of the boom “float” function is to protect the operator from serious injury in the event that the backhoe or tractor hitch would fail.

Best results are obtained by digging near the center of the swing arc so material can be dumped on either side.

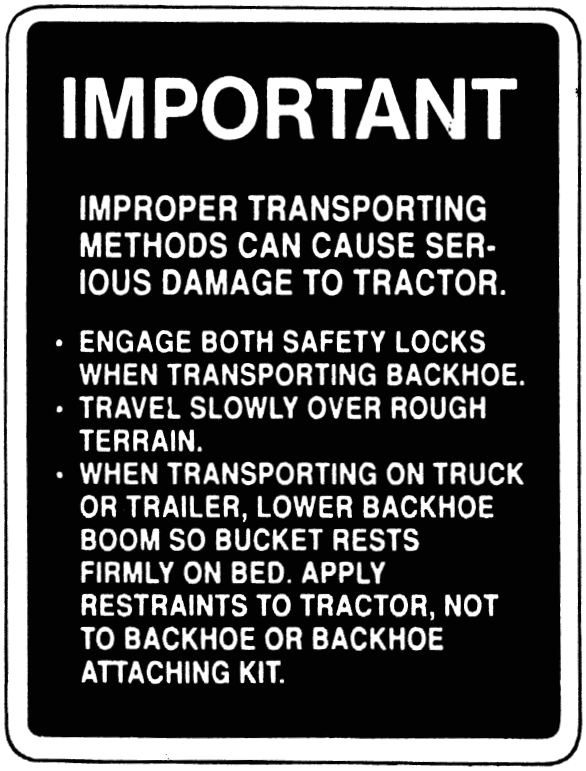
As the operator becomes more familiar with the operation of the backhoe, it will be common practice to operate two controls at one time. For example; with the bucket extended and the dipperstick extended, the lift control and crowd control can be operated together to bring the bucket toward the operator with down pressure on it. As the dipperstick approaches the operator, the crowd and bucket controls can be operated to close the bucket and trap the material. At the end of the stroke, the lift and crowd controls are operated to move the load up and away from the operator to save time in clearing the excavation.

This dual operation of controls will speed and simplify the digging operation. Normally the two or more movements will not be equal or even simultaneous, but as the pressure within the cylinders changes, and the resistance on an operating member of the hoe lessens, it will begin to move. It is balancing the force of one member against the other.

*NOTE: Actuating the bucket is the key to powerful digging. Operating the crowd and bucket controls simultaneously will insure a full bucket and prevent waste motion and time.*

**Transporting the Backhoe:**

*IMPORTANT: To prevent serious damage to the tractor, read and follow the instructions on the following decal:*




Location: Right Side of Boom

**⚠ CAUTION ⚠**

*To avoid possible injury, observe the following safety rules when transporting the backhoe:*

1. ALWAYS engage safety locks as shown on Figs. 1 and 3 when transporting backhoe.

2. TRAVEL SLOWLY over rough terrain, on hillsides, and around curves to prevent tipping.

3. DO NOT drive the tractor near the edge of a ditch or excavation.

4. USE accessory lights and SMV emblem when traveling on highways.

Before leaving backhoe operator's seat, position the backhoe for transport by raising boom, crowding dipperstick in, swinging to center and raising the stabilizers.

When transporting for long distances, periodically examine the backhoe and raise stabilizers and bucket back up to the full transport height. It is normal for the backhoe to slowly settle while being transported.

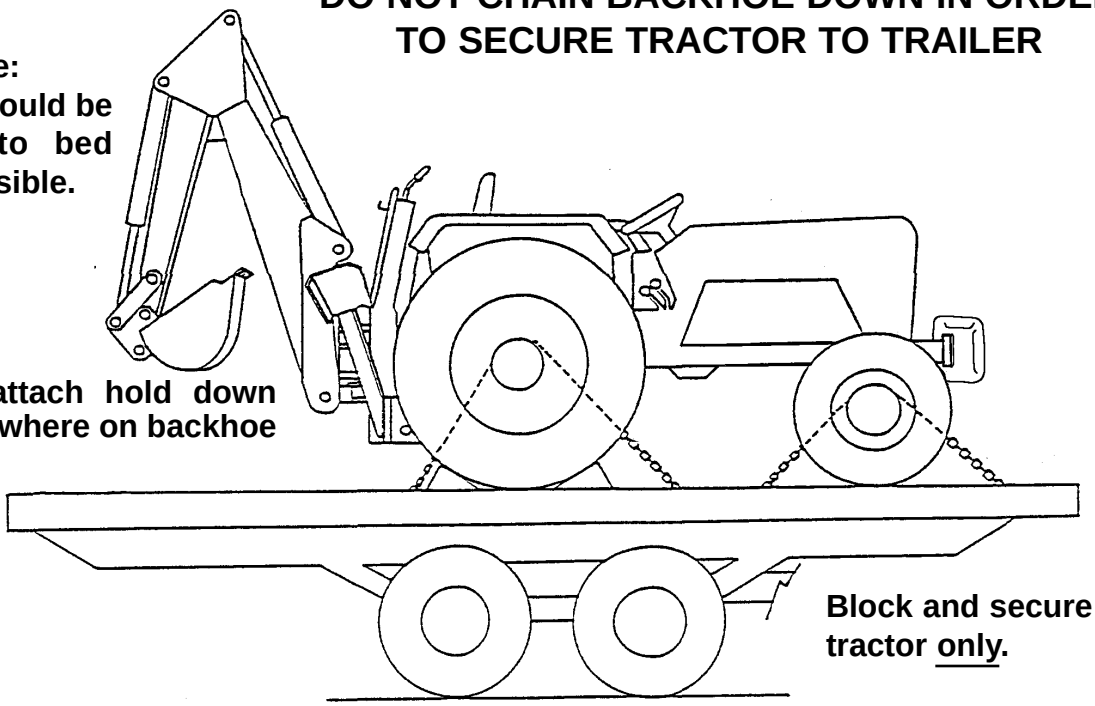
## WHEN TRANSPORTING

Figure 4

**⚠ CAUTION ⚠**

**DO NOT CHAIN BACKHOE DOWN IN ORDER TO SECURE TRACTOR TO TRAILER**

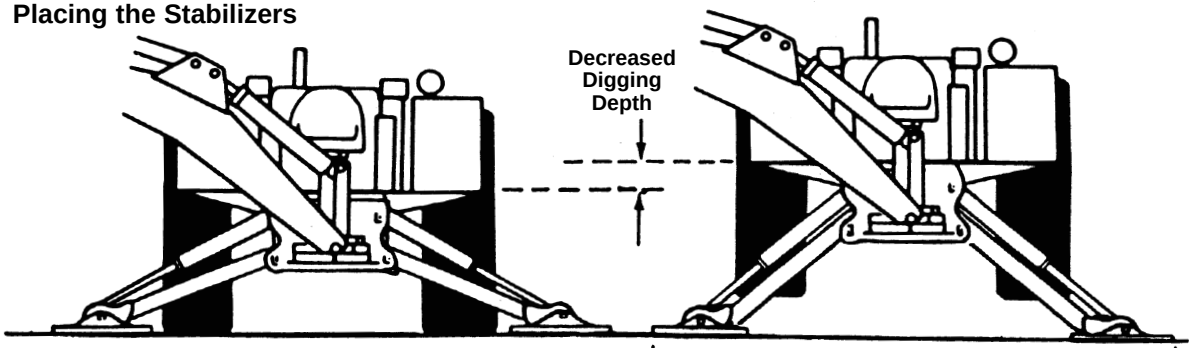
**Note: Bucket should be lowered to bed when possible.**



**DO NOT attach hold down chains anywhere on backhoe assembly.**

**Block and secure tractor only.**

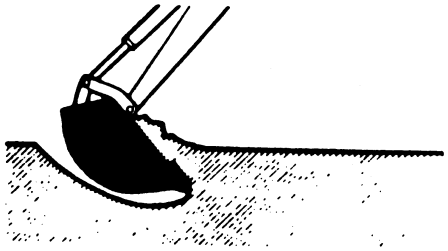
**Placing the Stabilizers**



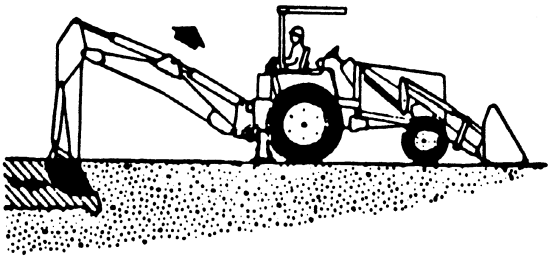

Set the stabilizers to remove weight from the rear wheels. The wheels are to remain touching the ground as this provides for the widest stabilizer stance and the lowest center of gravity. Raising the wheels off the ground will not only reduce stability and digging depth, but will impair performance and impose unnecessary stress on the unit.

## FILLING THE BUCKET

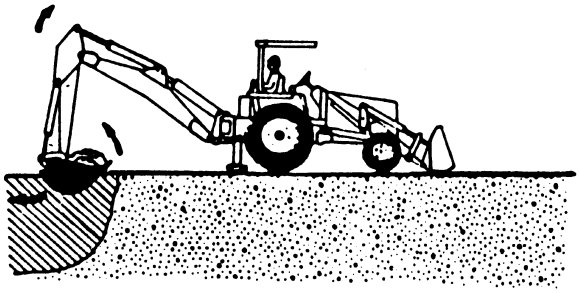
Control the bucket attitude throughout the digging cycle to keep teeth at the proper angle for best penetration. This will minimize dragging and scraping the bucket through the ground.



When digging in hard-packed soil, bucket penetration can be increased by applying down pressure with the boom while crowding in and curling the bucket. If the crowd action "stalls" it may be necessary to apply lift occasionally during the digging cycle to correct the bucket depth.

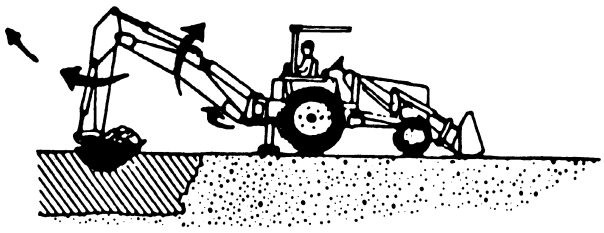


To obtain a cleaner trench and avoid the buildup of material directly in front of the backhoe, crowd out and completely curl the bucket while starting to lift it from the excavation. In this way, excess material will fall back into the excavation.



## DUMPING THE BUCKET

To dump the bucket at the end of the digging cycle, lift the bucket clear of the trench while crowding it out and swinging it to the spoil pile.

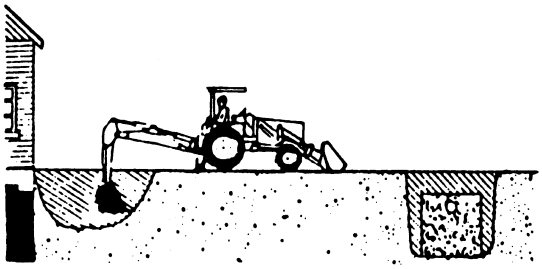


As the pile is approached, dump the bucket. When the bucket is empty, the dipperstick and bucket are in position to resume digging upon return to the trench.

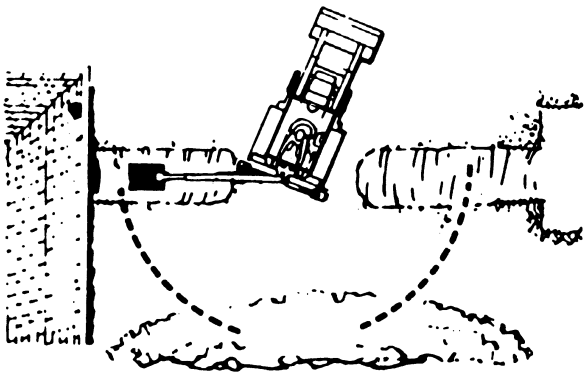
***IMPORTANT:*** *Avoid constant jarring or hammering-type contact between the spoil pile and the loaded bucket, as this may cause premature wear to the backhoe pins and bushings.*

## TRENCHING BETWEEN A BUILDING AND OPEN EXCAVATIONS

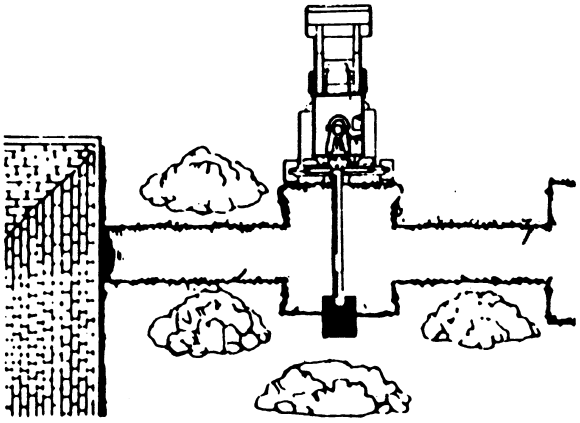
Start the trench at the building. Trench out halfway to the excavation. Then start trenching from the excavation to the first trench. Dig toward the first trench until there is just enough room to move the unit out between the two trenches.



Position the unit so the backhoe swing post is over the centerline of the trench connection. Dig with the backhoe at extreme swing positions, and in as close to the stabilizers as possible. Pile the spoil on the opposite side of the trenches.

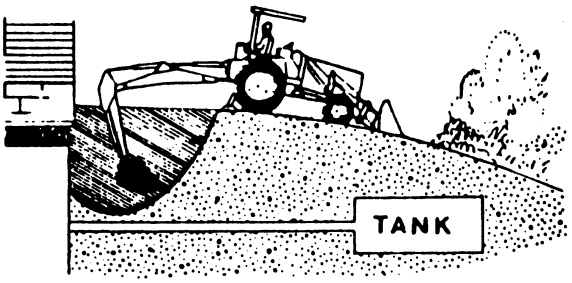


Position the unit forward with the lift and crowd levers so the two trenches can be connected. Pile the spoil on the opposite side of the trench.

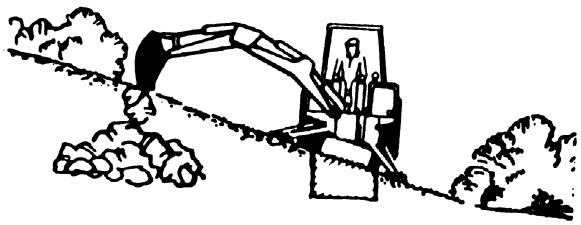


## SIDE SLOPE EXCAVATING OR TRENCHING

Dig with the backhoe uphill whenever possible.

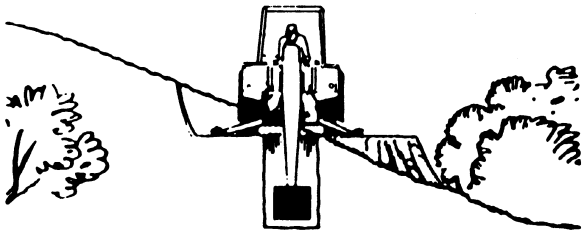



Level the backhoe on slopes with the stabilizers to dig plumb trenches, or use the backhoe or loader to cut a level slot for the uphill wheel and stabilizer. Pile the spoil from the slot on the low side.

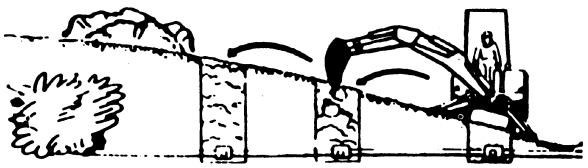


When on the side of a steep slope, cut a level surface along the uphill side of the trench with the loader.

Pile the spoil of the cut downhill. When digging, pile the spoil of the trench uphill.

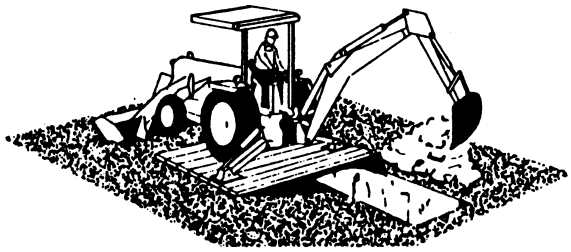


Dig field trenched progressively. As soon as one trench is completed, have the workmen lay the tile. Start the next trench, using the spoil to fill the previous trench.



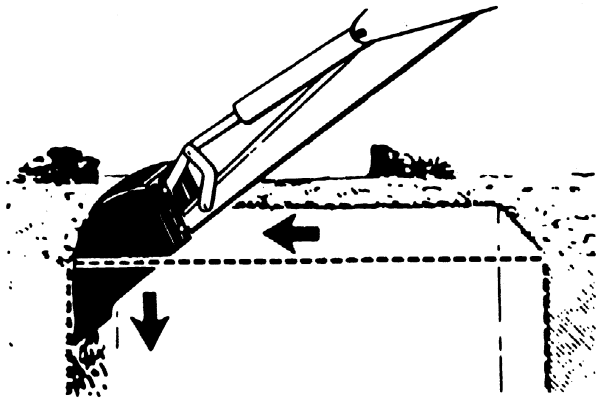
## MISCELLANEOUS

When finishing straight walls or bellholes in sandy soil, use a platform under the rear tires and the stabilizers. The platform distributes the load over a larger area and lessons the possibility of a cave-in. The platform also tends to keep the unit from creeping rearward if hard digging is encountered.

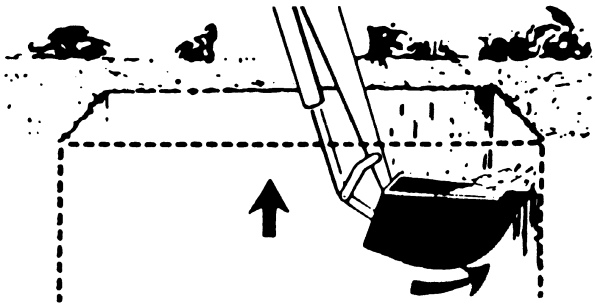


## FINISHING STRAIGHT WALLS

Finish the far wall by crowding out while forcing the bucket down from the boom. Actuate the bucket (curl out) to keep the bottom of the bucket vertical.



To finish the near wall, lift up and crowd in. Keep the edges of the bucket horizontal.



## BACKFILLING

Backfill by lifting the bucket over the spoil pile and then crowding in. Pull both the crowd and lift levers for smooth, even backfilling.

***IMPORTANT: Do not backfill by using the swing circuit and dragging the bucket sideways. Doing so can cause damage to the dipperstick boom swing cylinders or mainframe.***

# SERVICE

**⚠ CAUTION ⚠**

***To avoid possible injury, observe the following safety rules WHEN SERVICING the backhoe:***

1. ENGAGE safety locks as shown in Figures 1 & 3 before servicing the backhoe.

2. DO NOT oil, grease or adjust the backhoe while it is in motion.

3. DO NOT change any backhoe relief valve settings. They are factory set for best performance and safety.

4. ESCAPING FLUID under pressure can have sufficient force to penetrate the skin and cause serious injury. Be sure to relieve all pressure before disconnecting lines. Be sure all connections are tight and that lines, pipes and hoses are not damaged before applying pressure to the system.

5. FLUID ESCAPING from a very small hole can be almost invisible. Use a small piece of cardboard or wood - not your hands - to search for suspected leaks.

6. SEE A DOCTOR AT ONCE if injured by escaping fluid. Serious infection or gangrene can develop if proper medical treatment is not administered immediately.

7. PROTECT YOUR EYES - Wear safety glasses. Guard against injury when driving connecting pins or performing any repair in which particles can chip from work piece or striking tool.

## BEGINNING OF SEASON

Remove all protective covering.

Check hydraulic hoses for deterioration and replace, if necessary.

Lubricate all grease fittings and oil handle linkage.

Check hydraulic system for loss of fluid and, if necessary, fill to proper level.

Tighten all loose bolts, nuts and setscrews.

Inspect bucket teeth and, if necessary, sharpen or replace them.

Operate the backhoe slowly for a short time before placing the unit under full load.

## Bleeding Backhoe Hydraulic System

If the hydraulic hoses have been disconnected from the backhoe or tractor, all trapped air must be removed after the hoses are connected. Start tractor engine and operate backhoe through all movements fully, several times, to purge the system of air.

## Hydraulic System Hoses

Oil leaks in the pressure side of the system can be located by carefully inspecting the external area of the hoses and fittings.

Check the return side of the system for leaks by examining the oil in the reservoir. If air is being drawn into the system, the oil will contain air bubbles and appear to foam.

When tightening connections, always use two wrenches.

*IMPORTANT: Do not over-tighten fittings. Make them just tight enough to eliminate leaks.*

NEVER use teflon tape on pipe thread fittings. Always use a paste-type sealer.

Hoses on any backhoe are very severely worked and will fail in time. Examine them regularly and replace any that show signs of failure. Pay careful attention to the routing of hoses so they can move fully and freely without kinking, and cannot be pinched or cut by any part of the backhoe.

## Hydraulic System Reservoir

On PTO pump contained systems, maintain the reservoir oil at the proper level by looking at the dipstick. The dipstick/breather cap is located directly behind the right hand foot pad on the backhoe. When checking oil level, the backhoe should be extended to full reach with the bucket rolled back and resting on the ground. All cylinders are retracted except for the boom cylinder. Do not overfill; oil may be forced out of the breather cap.

Fill with:

SAE 10W40 engine oil with API “SF/SG” classification in northern climates.

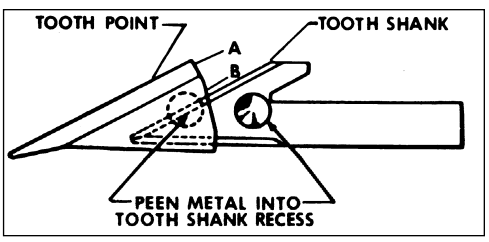
SAE 40W engine oil with API “SF/SG” classification in southern climates.

Change oil every 200 hours or more often if necessary.

If the tractor system supplies the hydraulic power, service according to the tractor instruction manual.

## Bucket Tooth Points

Figure 5



**Tooth Replacement**

The bucket tooth points are self-sharpening and will require little attention; however, these points on the bucket shanks can be replaced when they become badly worn or broken. If a tooth shank breaks off, becomes damaged or lost so that it cannot hold a tooth point, a new shank should be welded to the bucket in its place.

**Weld-On tooth points** can be removed from the welded tooth shank by hammering at "A" (Figure 5) on the tooth point or by driving a chisel at "B", just between the tooth point box section and the tooth shank. Install the new point and anchor it to the shank by peening at the location shown.

**Bolt-On** tooth points, when worn, can be replaced by removing the hardware that connects it to the cutting lip. Install new tooth and replace hardware if necessary.

**Roll-Pinned** tooth points, when worn, can be replaced by driving out the roll pin with a hammer and punch. Install the new tooth using a new roll pin and hammer.

## Tightening Nuts and Bolts

Periodically, check to be sure all bolts and nuts are tight. See torque chart, page 28 .

Check all pivot pins for cotter pins, washers and retainers; if missing, replace.

## Lubrication

*IMPORTANT: Avoid excessive greasing. Dirt collects on exposed grrease and increases wear greatly. After greasing, wipe off excessive grease from fittings.*

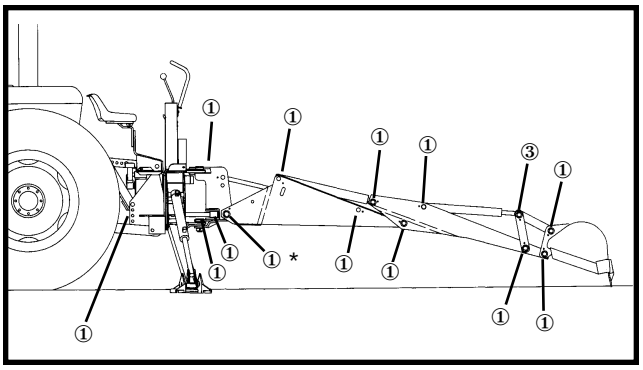


Figure 6 - Lubrication Points for Model 665H

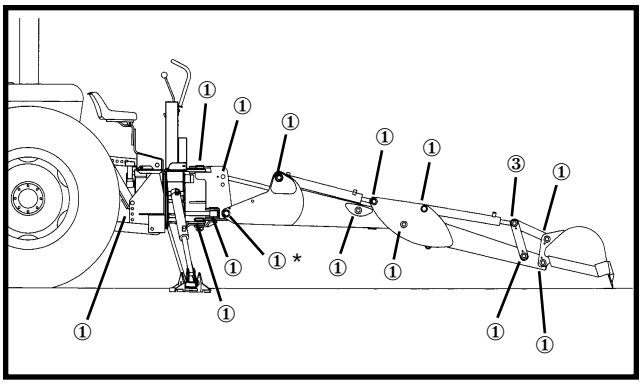


Figure 7 - Lubrication Points for Model 765H

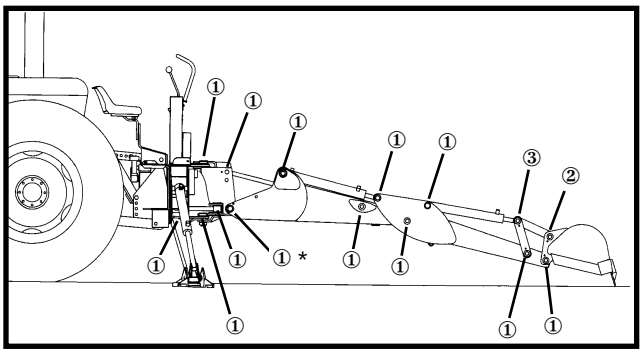


Figure 8 - Lubrication Points for Model 865H

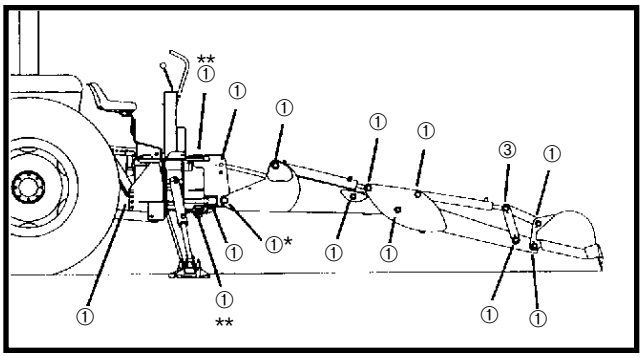


Figure 8A - Lubrication Points for Model 965H

** On Model 965H the Upper and Lower Swing Frame Pivot Bearings located in the Mainframe should be replaced every 300 to 400 operating hours.

Economical and efficient operation of the backhoe is dependent upon regular and proper lubrication of all moving parts with a quality lubricant.

All parts provided with grease fittings should be lubricated with a good quality chassis lube type grease. If any grease fittings are missing, replace them immediately. Clean all fittings thoroughly before using grease gun.

Lubricate all grease fittings at least twice daily, once at the beginning of operation and again approximately halfway through the work day.

Lower stabilizers to the ground, extend dipperstick and bucket and lower boom so bucket rests on the ground as shown in Figures 6, 7, 8 and 8A. Refer to these illustrations for the location of all grease fittings.

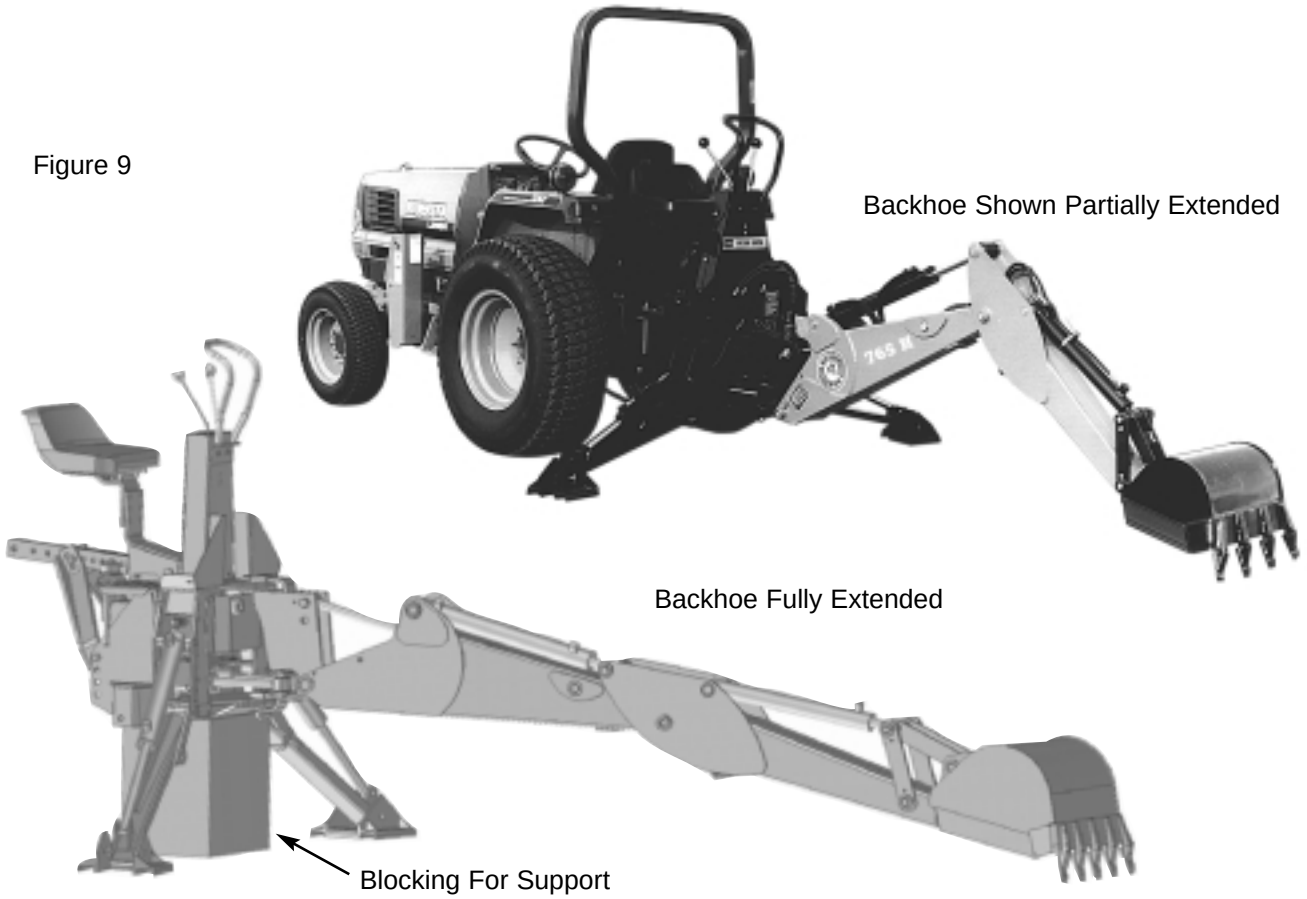
**IMPORTANT: Before greasing boom to swing frame pivot (*) shown in Figures 6, 7, 8 & 8A, raise boom and install transport lock pin shown in Figure 1.*

On **Models 665H, 765H, 865H and 965H** the following locations should be oiled with SAE30 oil:

A. Stabilizer Pivot Pins
B. Control Handle Linkage
C. Seat Bracket Pivot

# REMOVAL FROM TRACTOR - STORAGE

Figure 9




The backhoe is self-assisting during the installation and removal procedures. For removal and storage, follow these steps:

1. **Install the swing safety lock pin** as shown in Figures 1 and 3.

2. Stretch out the boom, dipper arm and bucket as shown in Figure 9. Lower the bucket to the ground so that it rests there solidly.

3. Raise the backhoe operator's seat to the raised position.

4. Place suitable blocking under the backhoe frame to support it adequately as indicated in Figure 9.

5. Detach the backhoe from the tractor mechanically only, not hydraulically at this point. Move the tractor a few inches away from the backhoe.

*Note: To facilitate this procedure, the backhoe can still be hydraulically moved, raised or lowered, to release the connection points of the carrying forces.*

6. Gently lower the backhoe onto the blocking as indicated in Figure 9. Leave the stabilizers outstretched and firmly in contact with the ground for added stability.

7. The hydraulic system can now be disconnected.

**⚠ CAUTION ⚠**

***Make sure tractor PTO is disengaged and engine shut off before disconnecting pump or hydraulic lines.***

a. On PTO pump self-contained systems the pump should be removed from the PTO shaft. The hydraulic system should always remain complete. No hoses or oil lines should be disconnected during correct removal and storage procedure.

b. On systems that tap into the tractor for hydraulic power, these lines can be disconnected now.

***IMPORTANT: Be sure to mark the lines to prevent mix-up, during hook-up, when the hoe is again attached to the tractor.***

*Be sure to cap the ends of the lines to keep clean while in storage.*

8. Now slowly drive the tractor forward and away from the backhoe. Be careful that all parts clear each other during separation.

9. Refer to the installation instructions for the attaching kit. This will help with the removal and reattaching.

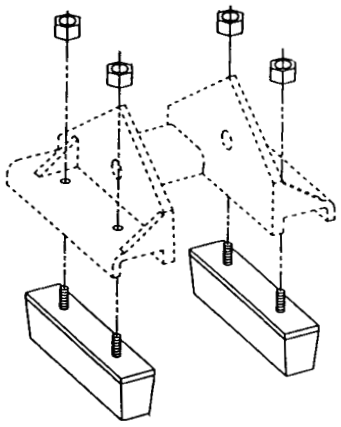
10. For long term storage, coat exposed lift, swing and stabilizer cylinder rods with grease.

11. Lubricate all grease fittings and oil stabilizer pivot pins, and complete handle linkage.

## Stabilizer Pads - 765H, 865H and 965H

The backhoe is supplied with flip-over stabilizer pads as standard equipment. They are suitable for most backhoe work and generally are all that is ever required. However, street pad kits are available as options for Models 765H, 865H and 965H backhoes. These kits bolt to the standard pads and increase the versatility of the backhoe. See Figure 10.

Figure 10



# Hydraulic Trouble Shooting

The trouble shooting material presented in this section is offered as a guide to diagnosing probable causes and remedies for general operational problems. Match your problem with the typical problem examples given, and note the numbers given for the possible cause. These numbers correspond with the possible cause and correction paragraphs that follow.

*NOTE: When using the following chart, if it is decided that an overhaul of components or pressure adjustments are necessary to correct malfunctioning, it is recommended that your dealer make these repairs. He is equipped to do this work.*

**⚠ WARNING ⚠**

***Escaping hydraulic / diesel fluid under pressure can penetrate the skin causing serious injury.***

***Do not use your hand to check for leaks. Use a piece of cardboard or paper to check for leaks.***

***Stop engine and relieve pressure before connecting or disconnecting lines.***

***Tighten all connections before starting engine or pressurizing lines.***

***If any liquid is injected into the skin, obtain medical attention immediately or gangrene may result.***

### Problems and Possible Causes

A. Machine fails to operate when started initially - 1, 2, 5, 7, 16, 24

B. Machine loses power after operating satisfactorily initially - 1, 8, 10, 14, 16, 24

C. Loss of power in lift or crowd cylinder, but other cylinders function properly - 23, 25, 30

### Problems and Possible Causes, Continued

D. Loss of power in any one cylinder including lift and crowd - 8, 9, 10, 11, 12, 13, 23, 25, 26

E. Loss of power in swing cylinders, but other cylinders functioning properly - 8, 9, 10, 11, 12, 13, 23, 24, 26

F. Maximum swing action cannot be obtained - 12, 15

G. Slow operation of machine (lack of power) all cylinders - 1, 4, 6, 14, 16, 24

H. Spongy or jerking action of cylinders and/or noisy operation - 1, 3, 4, 5

I. Lift, crowd or bucket cylinders drop under load when control spools shifted from neutral - 28, 30

J. Load drops or settles - 8, 10, 13, 26, 28

K. Leaky cylinders - 10, 11, 12, 13

L. Leaky valve - 8, 16, 17, 29

M. Sticky valve spool - 17, 20, 21, 22

N. Unable to push valve spool in - 17, 18, 20, 21, 22

O. Spring centered spools do not return to neutral - 17, 18, 19, 20, 21, 22

### Causes and Corrections

1. Low oil supply in reservoir - fill to proper level.
2. No oil supply to machine - oil is not being diverted from the prime mover hydraulic system. Be sure that the proper controls are actuated on the prime mover.
3. Air in system - bleed all circuits of air by operating machine at maximum oil flow and through full movements.
4. Oil viscosity too heavy, or oil is not at operating temperature - use recommended hydraulic fluid. Run machine until oil reaches operating temperature.
5. Pump not running - check pump drive to be sure it is engaged.
6. Insufficient pumping - advance engine throttle.
7. Improper hose connection - **IMPORTANT: Be sure inlet and return hoses are hooked up correctly. Improper hook-up will result in damage to the backhoe valve.**
8. Loose oil line connections, leaks in line or broken lines - tighten all hose connections and replace any damaged O-rings at leaking O-ring fittings. Check and replace any damaged hoses and lines.
9. Restrictions in oil lines - check and replace any damaged hoses and lines. Check for pinched hoses.
10. Oil is bypassing cylinder piston, scored piston, worn piston packing, or defective piston assembly - replace or rebuild the cylinder; replace damaged parts.
11. Scored piston rods and worn rod guides in cylinder - replace or rebuild the cylinder; replace damaged parts.

**Continued**

## Causes and Corrections, Continued

12. Bent piston rod in cylinder - replace or rebuild the cylinder; replace damaged parts.
13. Worn or damaged rod seals on cylinder; external leaks - repack cylinder. Rebuild cylinder, replacing damaged parts as necessary.
14. Diverter valve on prime mover leaking externally or bypassing oil internally through valve to reservoir - diverter valve may need rebuilding or replacing.
15. Something jamming the swing linkage - remove interference.
16. Excessive back pressure - relieve condition. May be restriction from outlet to reservoir.
17. Paint on valve spool; sticking valve spool or scored valve spool - clean valve spool. Binding is usually caused from an over tightened plug, mounting bolt, fitting in valve body or tie rod bolt. If a plug or fitting in the valve body is leaking, do not over tighten in an effort to stop leak. This will distort body casting and cause spools to bind. Instead, the plug and fitting should be removed from valve body and be reconnected, using a new O-ring. Do not apply excessive pressure on mounting bolts. The rods should be torqued to 20 ft./lbs. Never force spool, if binding occurs see item 30 at the end.
18. Oil leakage past spool seal into spool cap - remove cap. If it contains oil replace spool seal O-rings. Check O-ring retainer to be sure it is flat. If it has been “belled” check for restriction from outlet to reservoir of valve which would cause excessive back pressure. See item 30 at the end and item 9.
19. Broken return springs - replace springs, see item 30 at the end and Figure 11.
20. Bent spool - replace with new spool section. See item 30 at the end.
21. Foreign particles - clean system and valve.
22. Misalignment of control handle linkage - check linkage for binding condition.
23. Spool not moved to full stroke - check travel, should be 5/16” either way, or a total of 5/8”. See item 30 at the end.
24. Relief valve setting in backhoe control valve too low or defective - relief pressure will have to be checked and corrections made. Backhoe system pressure is 2100 psi for the 665H, 2100 psi for the 765H, 2400 psi for the 865H and 2250 psi for the 965H. Relief valve may need cleaning and overhauling, or entire cartridge must be replaced. See item 30 at the end.
25. Overload relief valve in the control valve stuck open or malfunctioning - clean relief carefully but do not disturb its pressure setting as it cannot be field calibrated, or replace cartridge. See item 30 at the end.
26. Worn control valve - replace the control valve.
27. Check poppet in the control valve not holding - clean check poppet(s) carefully, being sure that it moves freely with good spring action and seats properly or replace. See item 30 at the end.
28. Damaged or worn spool seals - replace spool end seals, see item 30 at the end.
29. Ball in anti-cavitation check valve is stuck or not seating properly - clean anti-cavitation valve carefully, being sure that checks move freely and seat properly, or replace cartridge. See item 30 next.
30. Problems involving the control valve proper:

    This valve is a precision device and is not intended for any extensive field adjustment or repair. Field replacement parts are limited to seal kits, cartridges, valve sections and tie rods.

    Replacement of these parts, the opening of check cavities and certain relief valve cavities to examine for trapped dirt, or the resetting of the main relief valve with the use of good pressure gauge, should be referred to qualified service personnel.

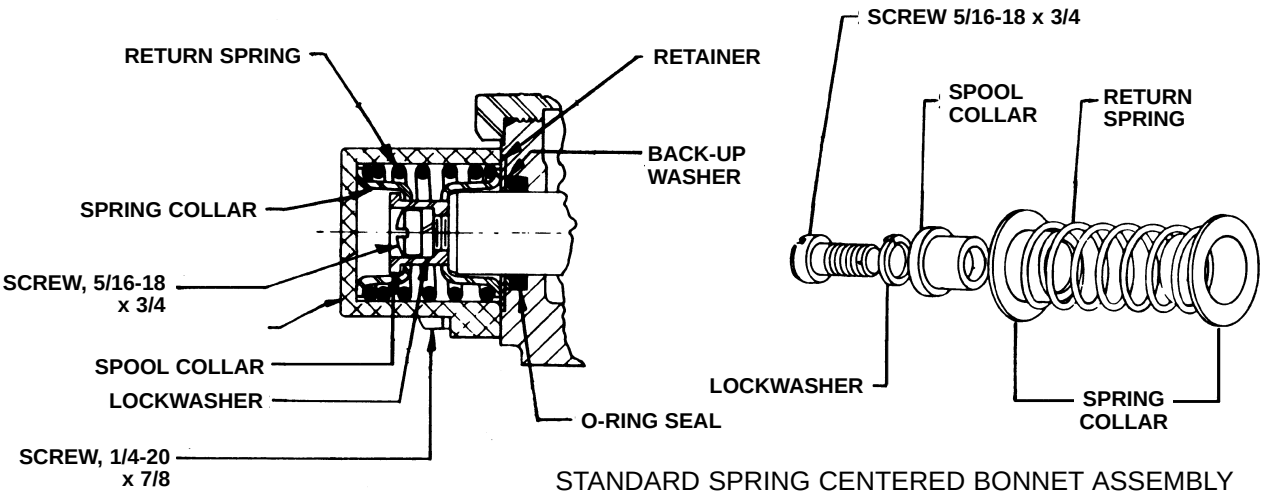
    Dirt and shreds of packing material are the usual causes of valve malfunction. Be sure the reservoir oil supply is kept clean and only factory supplied packings are used in cylinder repair. Everything must be clean and free of dirt during the oil line removal and replacement, and during any cylinder work.

    Pages 19 and 20, Valve Repair-Disassembly, explain the procedure to follow for valve repair.

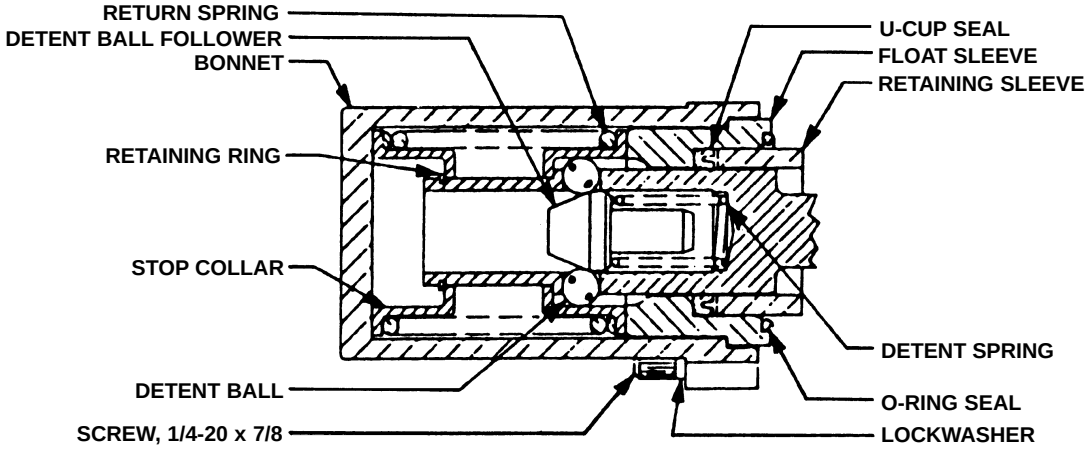
***The inclusion of this information and its use does not imply that the warranty will remain effective on the valve if it is tampered with during the warranty period.***

# VALVE REPAIR - DISASSEMBLY

Figure 11




STANDARD SPRING CENTERED BONNET ASSEMBLY




FLOAT BONNET ASSEMBLY

## Replace Center Section Assemblies:

*Note: For the purpose of these instructions we will consider the section containing the MAIN RELIEF VALVE as the left side of the valve.*

1. Remove control valve from the backhoe.

2. Thoroughly clean the exterior of the valve before beginning disassembly procedures.

3. Since the valve will be assembled in the same order, each section should be marked numerically so that they can be reassembled in the same sequence.

4. Mount the valve vertically in a vise to facilitate disassembly and assembly.

5. Remove the 3 tie rod nuts from the right end section, using a thin-wall socket.

6. Valve sections can now be removed by sliding the sections along the tie rods.

7. Thoroughly clean the O-ring counterbores and the ground surfaces of each section. Place O-ring seals, ordered as a kit, in proper counterbores. For better sealing it is recommended that all O-rings, used in the counterbores, are replaced with new parts.

8. Replace the sections on tie rods with the O-ring counterbores facing the right end of the valve. Be careful replacing the sections so that the section O-rings are not moved from the counterbores.

9. When all sections are assembled on the tie rods, tighten the tie rod nuts equally to 20 ft. lbs. torque, NO MORE - NO LESS, or spools may bind and stick.

## Replacing Spool Seals:

*Note: For the purpose of these instructions we will consider the control handle side of the valve as the FRONT, and the opposite side as the BACK.*

1. Remove control valve from the backhoe.

2. Thoroughly clean the exterior of the valve before beginning disassembly procedures.

3. At the BACK of the valve remove all bonnet assembly parts which are connected to the spool. Keep parts in the order of disassembly. See Figure 11 for the parts involved in the make-up of the bonnet assembly.

*IMPORTANT: DO NOT remove the spool from the valve. The seals can be replaced externally. Prevent spools from turning or moving by inserting a screw driver through the clevis slot, or by running a rod through the pin hole and using the rod as a handle. DO NOT hold the spool with a wrench. This will destroy the finish.*

4. At the BACK of the valve, remove seal retainer, back-up washer, and spool O-ring seal, or retaining sleeve,bonnet O-ring seal and spool U-cup seal.

5. Thoroughly clean counterbores.

6. Install new seals:

A. Spring-Centered Bonnet Assembly Only:

Lightly oil new O-ring seal. Slide O-ring seal over valve spool and insert in seal counterbore. Replace back-up washer and seal retainer.

B. Float Bonnet Assembly Only:

Replace retaining sleeve on valve spool. Lightly oil new U-cup seal. Slide U-cup seal over valve spool being careful to orient seal as shown in Figure 11. Install new O-ring seal in bonnet counterbore.

7. At the BACK of the valve replace bonnet assembly parts, reversing the order in which they were disassembled in step 3. Use 12 ft. lbs. torque to tighten assembly screw on spring centered bonnet assembly.

8. At the FRONT of the valve remove all parts connected to the spool (handle, linkage, etc.).

9. At the FRONT of the valve remove seal plate retainer, seal retainer, back-up washer and spool O-ring seal.

10. Thoroughly clean counterbore.

11. Lightly oil new O-ring seal. Slide O-ring seal over valve spool and insert in seal counterbore. Replace back-up washer, seal retainer, and seal plate retainer.

12. Reattach all parts connected to the spool (handle, linkage, etc.).

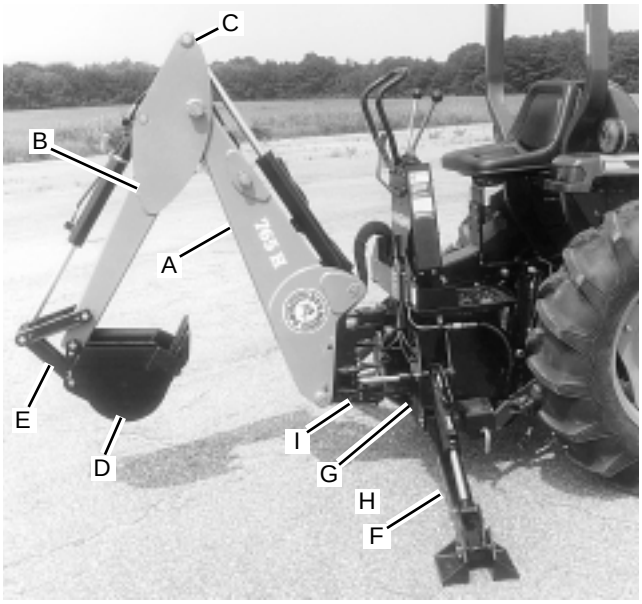
# ASSEMBLY

Basic components for all models can be identified in Figure 12. Refer to Page 38 for photographs of units on their shipping pallets.

## General:

The backhoe has been partially disassembled and strapped to a skid for shipping purposes. Initial installation on the tractor will require a hoist or other device capable of safely lifting the entire backhoe from the skid. After the initial installation is complete, the backhoe can serve as its own erecting hoist, by lowering stabilizers and bucket to the ground. Additional lifting devices will not be required for normal removal and reattaching.

Figure 12




## Assembly(865H & 965H) - Figure 12

*IMPORTANT: Tighten all hardware to torque requirements specified in torque chart.*

1. Remove the stabilizer assemblies and any miscellaneous items which have been fastened to the skid and arrange conveniently. Reposition Stabilizer Cylinders from their shipping configuration, by assembling them into the mainframe, using the hardware provided. Be sure cylinder ports are pointed upward and hoses are routed above the cylinder to mainframe pivot pin connection. Refer to page 38.

**⚠ CAUTION ⚠**

***DO NOT cut any strapping that fastens the backhoe mainframe and swing frame to the skid base at this time.***

2. Support boom(A) and dipperstick (B) with hoist and remove boom transport lock pin. Lower boom and manually extend dipperstick until it rests on ground. Move control handle to “BOOM DOWN” position as required to aid movement.

**⚠ CAUTION ⚠**

***Be sure hoist being used is suitable, has sufficient capacity and is in the proper position. Do not allow anyone under a backhoe member supported by hoist.***

3. Remove plastic bag containing bucket pins from backhoe. Attach bucket (D) to dipperstick using one pin, two bolts, nuts, lockwashers, pin retainers and washers as necessary.

4. Attach bucket link (E) to bucket, using same hardware as listed for step #3.

5. Attach hoist to backhoe to prevent tipping. Remove all remaining strapping and attach stabilizers (F) to mainframe (G) using pins and hardware assembled to backhoe.

6. Attach stabilizer cylinders (H) to stabilizers using pins and hardware assembled to stabilizers.

7. Using caution to prevent tipping, raise mainframe with hoist to a height of approximately 11" for 862H and 13" for 962H and remove skid. Block mainframe (G) and swing frame (I) securely.

8. Follow the Attaching Kit Assembly Instructions to mount the backhoe to the tractor. Check the installation carefully and make sure that all members are correctly installed and securely fastened.

## Assembly:(665H & 765H) - Figure 12

(See "General" note, page 20)

**IMPORTANT: Tighten all hardware to torque requirements specified in torque chart.**

**⚠ CAUTION ⚠**

**DO NOT cut any strapping that fastens the backhoe mainframe and swing frame to the skid at this time.**

1. Remove the stabilizer assemblies and any miscellaneous items which have been fastened to skid and arrange conveniently. Reposition stabilizer cylinders from their shipping configuration, by assembling them into the mainframe, using the hardware provided. Be sure cylinder ports are pointed upward and hoses are routed above the cylinder to mainframe pivot pin connection. Refer to page 36.

2. Support Boom (A) and Dipperstick (B) with hoist and remove Boom transport lock pin. Lower Boom and manually extend Dipperstick until it rests on the ground. Move control handle to "Boom Down" position as required to aid movement.

**⚠ CAUTION ⚠**

**Be sure hoist being used is suitable, has sufficient capacity and is in the proper position. Do not allow anyone under a backhoe member supported by hoist.**

3. Remove plastic bag containing bucket pins from backhoe. Attach Bucket (D) to Dipperstick using one pin, two bolts, locknuts, pin retainers, and washers as needed to take up gap under pin retainers.

4. Attach Bucket Link (E) to Bucket, using same hardware as listed for step #3.

5. Reposition hoist on backhoe to prevent tipping and raise Mainframe slightly. Remove all remaining strapping and crate base. Using caution to prevent tipping, raise Mainframe (G) approximately 10" and block Mainframe and Swing Frame securely.

6. Attach Stabilizers (F) to Mainframe (G) using pins and hardware assembled to Stabilizers (F).

7. Attach Stabilizer Cylinders (H) to stabilizers (F) using pins and hardware assembled to Stabilizers (F).

8. Follow the Attaching Kit Assembly Instructions to mount the backhoe to the tractor. Check the installation carefully and make sure that all members are correctly installed and securely fastened.

# ATTACHING KIT INSTRUCTIONS (For 665H & 765H)
## 3-POINT HITCH LINKAGE & HYDRAULIC HOOK-UP TO TRACTOR HYDRAULIC SYSTEMS

### General Description

Mounting and hydraulics kits include two hoses which can be used to connect the backhoe to the tractor hydraulic system. Additional hydraulic components or kits will be required to complete the hook-up to the tractor hydraulic system. Refer to the Hydraulic Hook-up section for further information. Pumps and reservoir kits are available as options.

The backhoe is mounted on the tractor lower link arms and an adjustable upper link is supplied to replace the tractor upper link. A set of stabilizer arms is included. They bolt from the adjustable upper link to the backhoe mainframe, locking the hoe rigidly in one position.

***IMPORTANT: Tractor lower links must be kept free of lifting forces at all times after installation of the attaching kit, by keeping tractor quadrant lever in the lowered position.***

*IMPORTANT: If the 3-Point Kit is to be used with a PTO & Reservoir Kit, the Reservoir Tank and it's fittings should be installed before proceeding with the 3-Point installation.*

## ASSEMBLY (Refer to Figures 13 & 14)

*IMPORTANT: Tighten all hardware to the torque requirements specified in the torque chart.*

**⚠ WARNING ⚠**

**To prevent bodily injury, do not operate backhoe unless Lower Link Weldments (1, 2) are properly installed and adjusted. Failure to do so may result in backhoe being thrust upward, crushing operator against cab or ROPS.**

1. Use hoist to raise the backhoe mainframe so that the boom pivot pin is aproximately 12" (662H), or 14" (762H), off the ground.

2. Back tractor close to the backhoe. Connect tractor lower link arms to lower link mounts at position "C", Figure 13, using two L-pins (3), two cotter pins (4), and two wire form cotter pins (5) as shown in Figure 14.

*NOTE: If tractor has a Category II hitch, install two bushings (6) in lower link arms as shown in Figure 14.*

3. Attach upper braces (7), Figure 14 to backhoe with 3/4 x 7-1/2" bolt (8), lockwasher (9), flat washers (10) and nut (11). Do not tighten hardware at this time.

4. Install bushing (12) or bushing (13) in the hole of the upper bar (14) that most closely matches the diameter of the tractor upper link pin, as shown in Figure 14. No bushing is necessary for Category II tractors.

5. Secure upper bar (14) between upper braces (7) using 3/4 x 4-1/2" bolt (9), flat washers (10), lockwasher (9) and nut (11). Use hoist to raise or lower backhoe slightly until a hole in the upper bar aligns with a hole in the upper braces. See Figure 13.

6. Attach RH lower link weldment (1) and LH lower link weldment (2) to backhoe mainframe using 3/4 x 2-1/4" bolt (15), flat wahser (10), lockwasher (9), and nut (11). See Figure 14.

7. Align RH and LH link weldment (1, 2) with a hole in the upper bar/brace assembly, as close to the tractor as possible. Use 3/4 x 6" bolt(16), flat washer (10), lockwasher (9), and nut (11). See Figure 14. You may need to return to Step 6 and readjust upward or downward the bolt connection.

8. Remove backhoe from the tractor.

9. Install connector plate (17) to RH and LH lower link weldments (1, 2) using 1/2 x 1-3/4" bolt (18), lockwasher (19), and nut (20). See Figure 14.

10. Tighten all hardware at this time. Check your installation very carefully to be sure all members are correctly installed and securely fastened.

10A. If using optional PTO Pump and Reservoir Kit proceed to that section prior to remounting the backhoe onto the tractor.

11. Connect hoses from the backhoe control valve to the tractor hydraulic system as described in "Hydraulic Hook-Up" section, prior to remounting the backhoe onto the tractor.

Figure 13

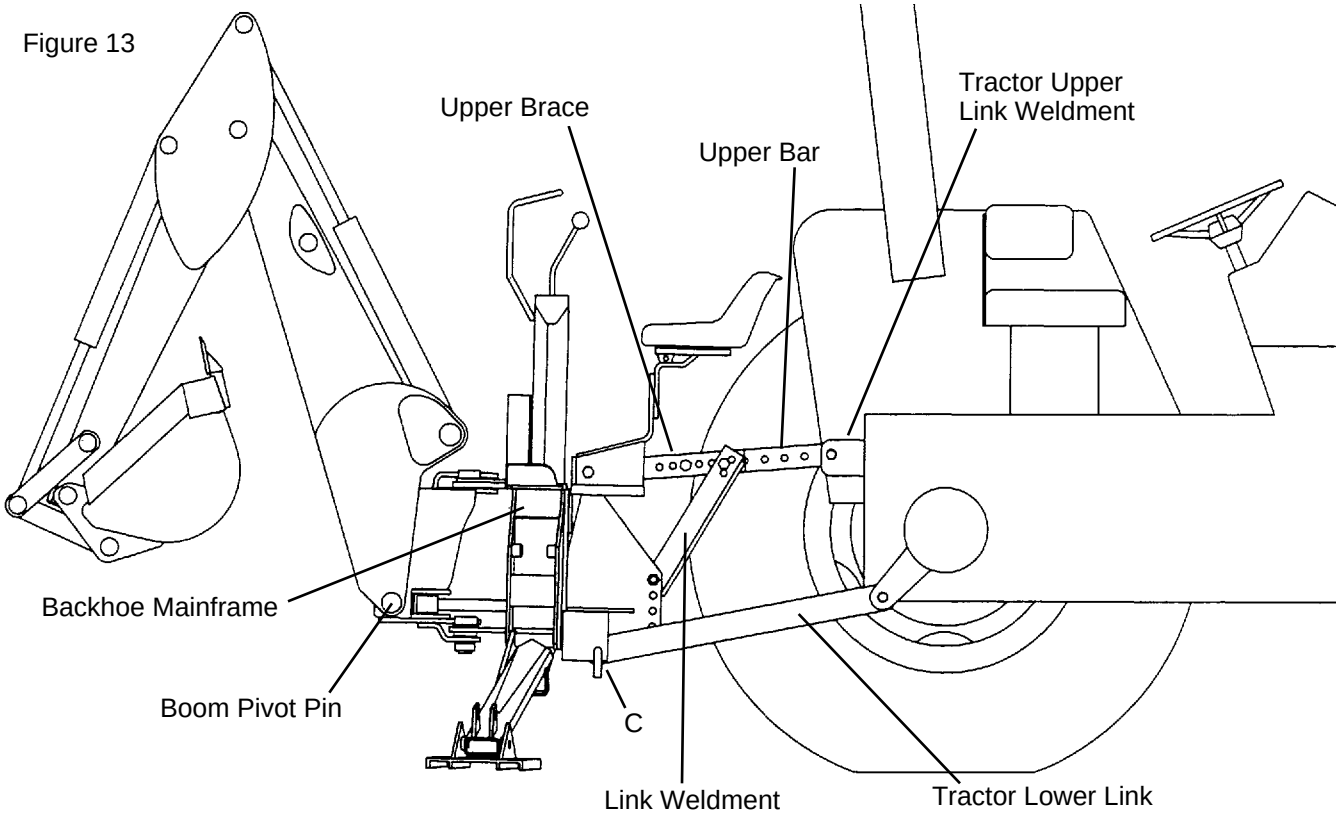
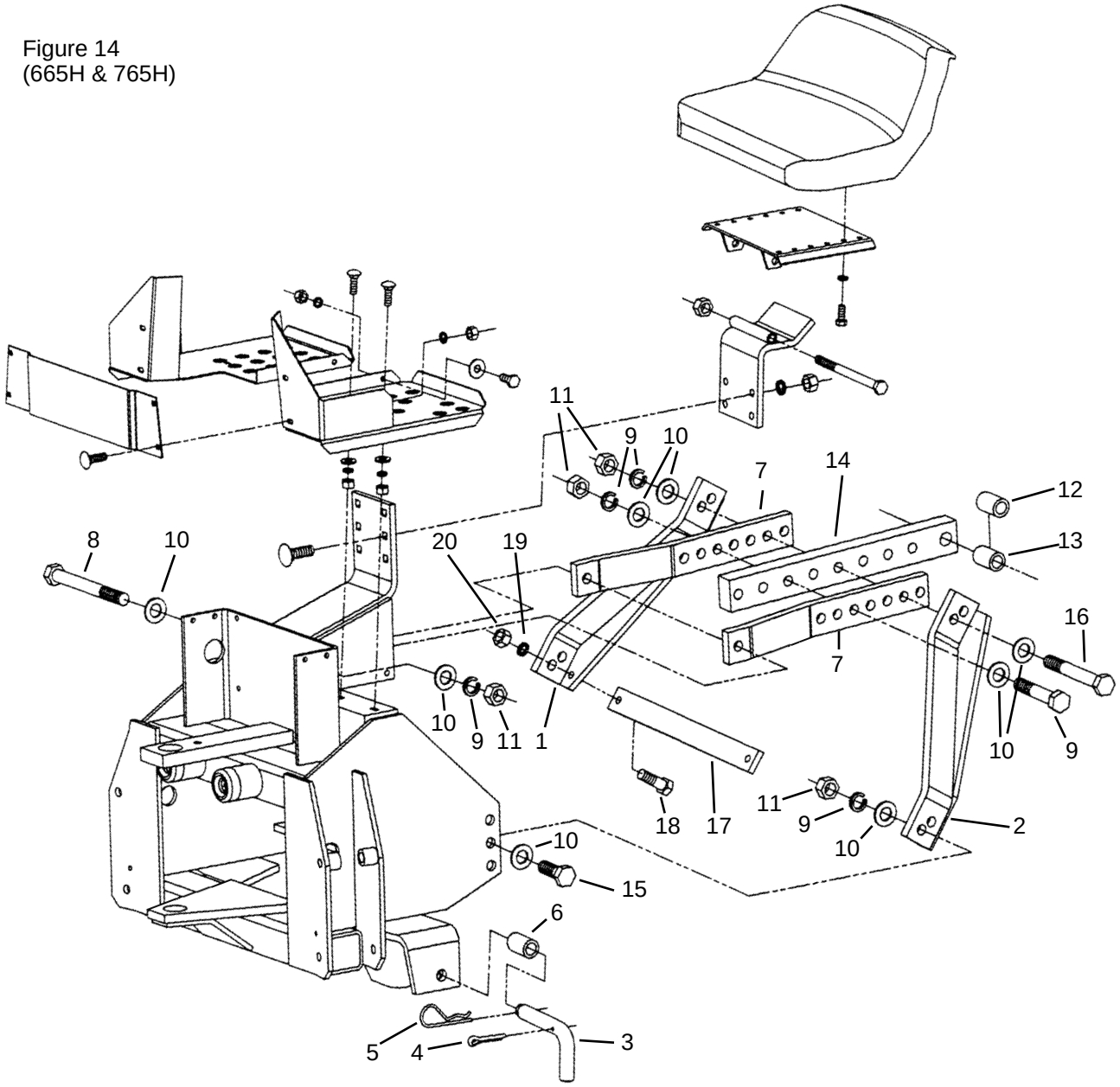


Figure 14
(665H & 765H)




# ATTACHING KIT INSTRUCTIONS (For 865H)

## 3-POINT HITCH LINKAGE & HYDRAULIC HOOK-UP TO TRACTOR HYDRAULIC SYSTEMS

### General Description

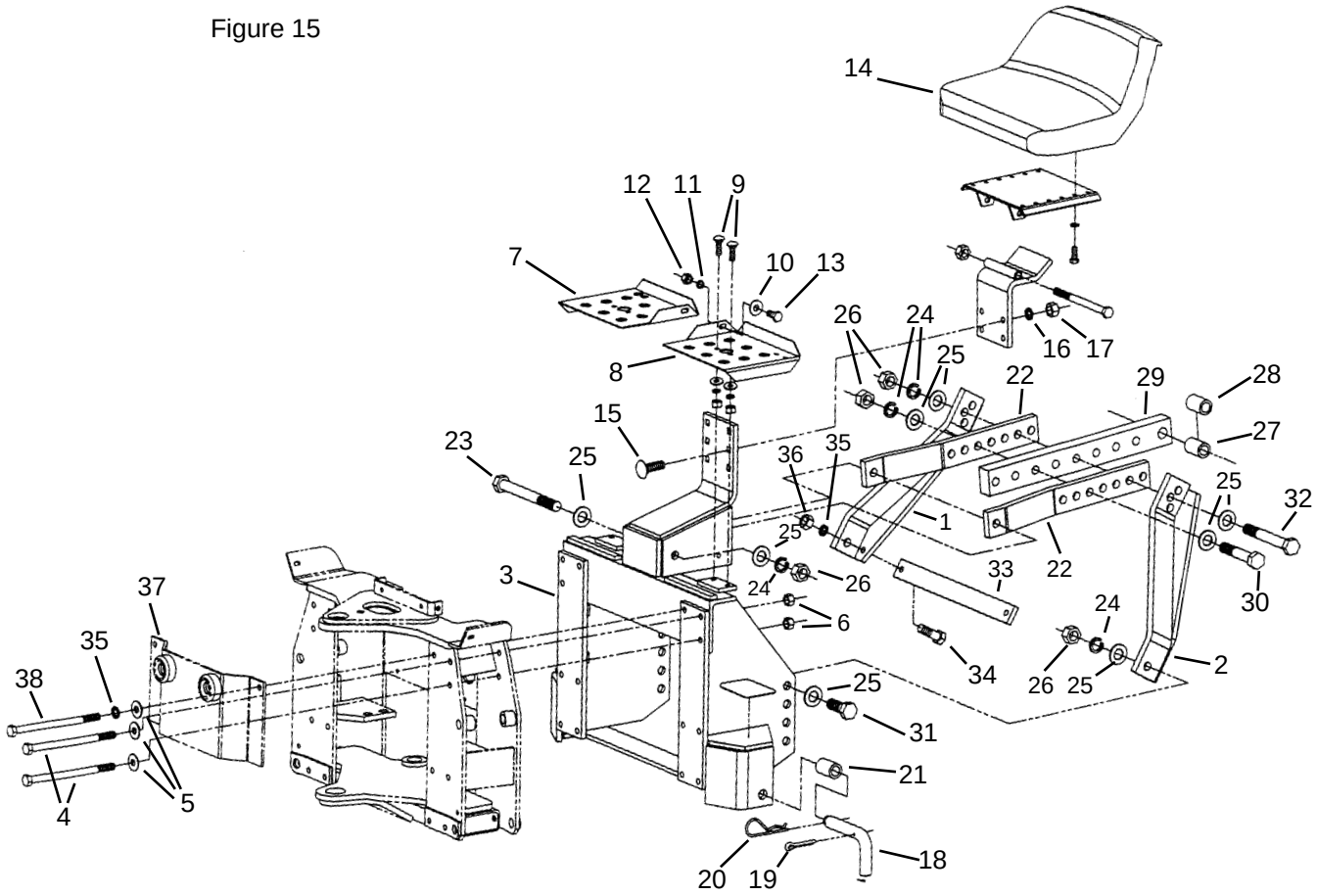
Mounting and hydraulic kits include two hoses which can be used in connecting the backhoe control valve to the tractor hydraulic system. Additional hydraulic components or kits will be required to complete the hook-up to the tractor hydraulic system. Refer to "Hydraulic Hook-Up" section for further information. Pump and reservoir kits are available as options.

The backhoe is mounted on the tractor lower link arms and an adjustable upper link is supplied to replace the tractor upper link. A set of stabilizer arms are included. They bolt from the adjustable upper link to the backhoe mainframe, locking the hoe rigidly in one position.

***IMPORTANT- Tractor lower links must be kept free of lifting forces at all times, after installation of the attaching kit, by keeping tractor quadrant lever in the lowered position.***

*IMPORTANT: If the 3-Point Kit is to be used with a PTO & Reservoir Kit, the Reservoir Tank and it's fittings should be installed before proceeding with the 3-Point installation.*

Figure 15




## ASSEMBLY

*IMPORTANT: Tighten all hardware to the torque requirements specified in the torque chart.*

**⚠ WARNING ⚠**

**To prevent bodily injury, do not operate backhoe unless Lower Link Weldments ( Figure 15 - 1, 2) are properly installed and adjusted. Failure to do so may result in backhoe being thrust upward, crushing operator against cab or ROPS.**

1. Use hoist to raise the backhoe mainframe so that the boom pivot pin is approximately 16" off the ground.

2. Attach adapter weldment (3) to backhoe mainframe using twelve 1/2 x 7-1/2" bolts (4), washers (5), and locknuts (6), as shown in Figure 15.

3. Install RH foot pad (7) and LH foot pad (8) to adapter weldment (3) as shown in Figure 15. Use four carriage 5/16 x 1" bolts (9), washers (10), lockwashers (11), and nuts (12). Also use two 5/16 x 1-1/4" bolts (13), washers (10), lockwashers (11), and nuts (12).

4. Attach seat assembly (14) to adapter weldment (3) as shown in Figure 15. Use four carriage 1/2 x 1-3/4" bolts (15), lockwashers (16), and nuts (17).

5. Back tractor close to the backhoe. Connect tractor lower link arms to lower link mounts at position "C", Figure 16, using two L-pins (18), two cotter pins (19), and two wire form cotter pins (20) as shown in Figure 15.

*NOTE: If tractor has a Category II hitch, install two bushings (21) in lower link arms as shown in Figure 15.*

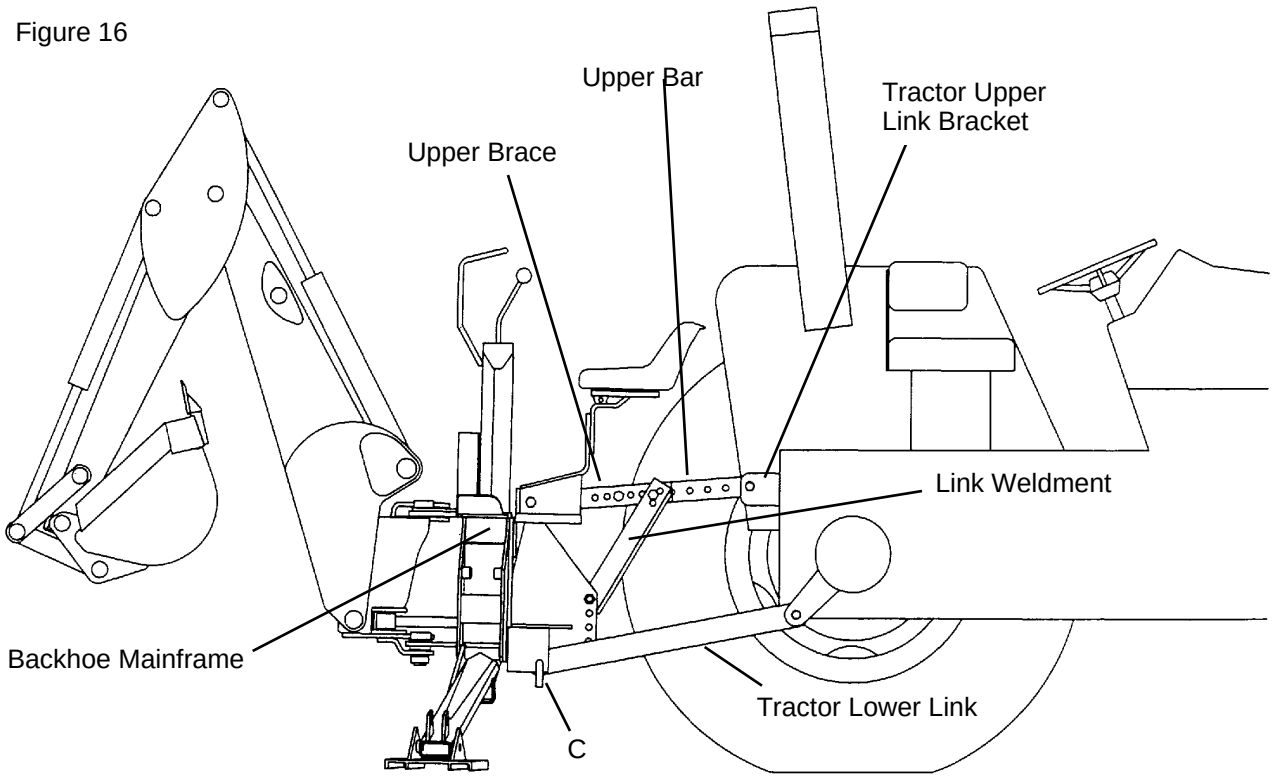
6. Attach upper braces (22), Figure 15 to backhoe with 3/4 x 7-1/2" bolt (23), lockwasher (24), flat washers (25) and nut (26). Do not tighten hardware at this time.

7. Install bushing (27) or bushing (28) in the hole of the upper bar (29) that most closely matches the diameter of the tractor upper link pin, as shown in Figure 15. No bushing is necessary for Category II tractors.

8. Secure upper bar (29) between upper braces (22) using 3/4 x 4-1/2" bolt (30), flat washers (25), lockwasher (24) and nut (26). Use hoist to raise or lower backhoe slightly until a hole in the upper bar aligns with a hole in the upper braces. See Figure 15.

9. Attach RH lower link weldment (1) and LH lower link weldment (2) to backhoe mainframe using 3/4 x 2-1/4" bolt (31), flat washer (25), lockwasher (24), and nut (26). See Figure 15.

Figure 16




10. Align RH and LH link weldment (12) with a hole in the upper bar/brace assembly, as close to the tractor as possible. Use 3/4 x 6" bolt (32), flat washer (25), lockwasher (24), and nut (26). See Figure 15. You may need to return to Step 6 and readjust upward or downward the bolt connection.

11. Remove backhoe from the tractor.

12. Install connector plate (33) to RH and LH lower link weldments (1, 2) using 1/2 x 1-3/4" bolt (34), lockwasher (35), and nut (36). See Figure 15.

13. Tighten all hardware at this time. Check your installation very carefully to be sure all members are correctly installed and securely fastened.

14. If using optional PTO Pump and Reservoir Kit proceed to that section prior to remounting the backhoe onto the tractor.

15. Connect hoses from the backhoe control valve to the tractor hydraulic system as described in "Hydraulic Hook-Up" section, prior to remounting the backhoe onto the tractor.

16. Attach bumper plate (37) to backhoe mainframe using two bolts (38), lockwashers, and flat washers (35, 5) once the "Hydraulic Hook-Up" has been completed. See Figure 15.

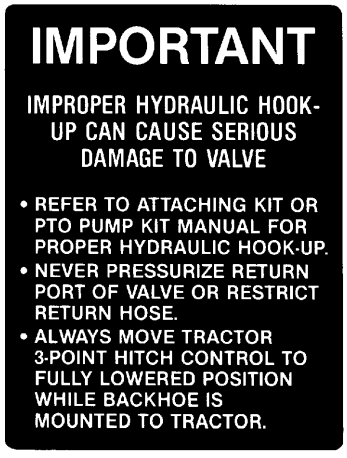
## Hydraulic Hook-Up

If the optional Pump and Reservoir Kit is to be used, refer to the instructions for that kit for proper assembly.

There are four basic methods of hooking up the backhoe to the hydraulic system of a tractor. The correct method for the particular tractor will depend on the remote couplers available, whether a loader valve or other accessory valve is connected to the tractor system, and whether the tractor has an open-center system (constant pumping of oil to control valve and back to reservoir) or a closed-center system (no flow of oil until there is a demand at one hydraulic cylinder). The four hook up methods are described below.

*IMPORTANT: Follow instructions carefully when connecting backhoe to tractor hydraulic system.*

The decal shown below is located on the Left Hand toe shield.



*Note: Do not connect hoses from the backhoe control valve to the tractor hydraulic system until initial assembly of mounting kit is complete.*

1. OPEN-CENTER SYSTEM WITH LOADER VALVE OR OTHER ACCESSORY VALVE CONNECTED TO THE TRACTOR HYDRAULIC SYSTEM:

When a loader valve or other accessory valve must be connected to the tractor hydraulic system in addition to the backhoe control valve, a Power Beyond Kit is required. This kit converts the backhoe valve so that pressurized hydraulic oil can be directed to another open-center valve for a loader or other accessory. This allows the backhoe valve and the other valve to be connected to the tractor hydraulic system simultaneously, without the inconvenience of using a flow diverting valve.

Since the Power Beyond Kit is used with open-center tractor hydraulic systems, oil constantly flows from the pump, through the backhoe valve and the loader valve or other accessory valve, and then to the reservoir. See further in this manual for instructions on proper assembly.

2. CLOSED CENTER SYSTEM: (665H &765H))

Because a closed-center system requires no flow of oil through the backhoe control valve when the levers are in a neutral position, the **665H & 765H backhoes must not be connected to a closed-center tractor hydraulic system. A PTO pump kit is required if the tractor is to be mounted to a tractor with closed-center hydraulic system.**

***IMPORTANT: Do not connect a 665H or 765H backhoe control valve to a closed-center tractor hydraulic system, or serious damage to backhoe valve or tractor hydraulic system may result.***

3. OPEN-CENTER SYSTEM WITH RETURN OIL NOT REQUIRED FOR LUBRICATION - Figure 17

The pressure hose (A) on the backhoe control valve should be connected to the pressure port of the tractor's remote couplers or directly to the tractor valve. The return hose (B) on the backhoe control valve should be connected directly to a port on the reservoir, as shown in Figure 17.

***IMPORTANT: Never connect the return hose to a tractor remote coupler which can be pressurized. Accidental pressurization can cause serious damage to backhoe valve.***

4. OPEN-CENTER SYSTEM WITH RETURN OIL REQUIRED FOR LUBRICATION - Figure 18

On some tractors, the return oil cannot be routed directly to the reservoir because it is required for the lubrication of other functions. Check this characteristic with your dealer. The pressure hose (A) on the backhoe control valve must be connected to the pressure port of the tractor's remote couplers or directly to the tractor valve. The return hose (B) on the backhoe control valve must be connected to a surge relief valve as shown in Figure 18.

*Note: The surge relief valve is not supplied with the backhoe or mounting kit and must be ordered separately to complete this type hydraulic hook-up.*

Complete the hydraulic hook-up by connecting the surge relief valve to the return port of tractor remote couplers or directly to the tractor valve, and by connecting a hose from the TANK port of the surge relief valve to the tractor reservoir as shown in Figure 18. The surge relief valve is used to protect the backhoe valve from damage caused by accidental pressurization or high back pressure build-up. If this happens, oil will be vented from the TANK port of the surge relief valve to the tractor reservoir to prevent loss of vented oil.

Figure 17

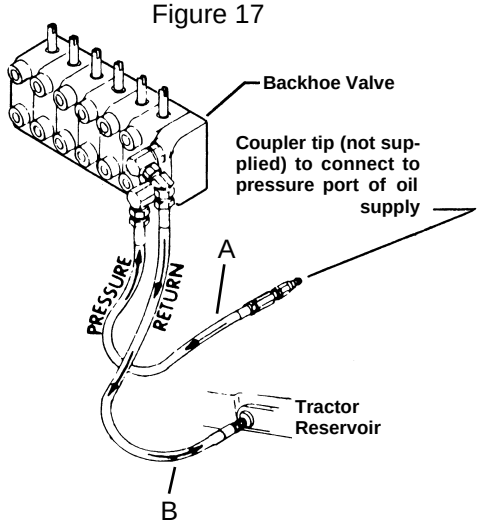
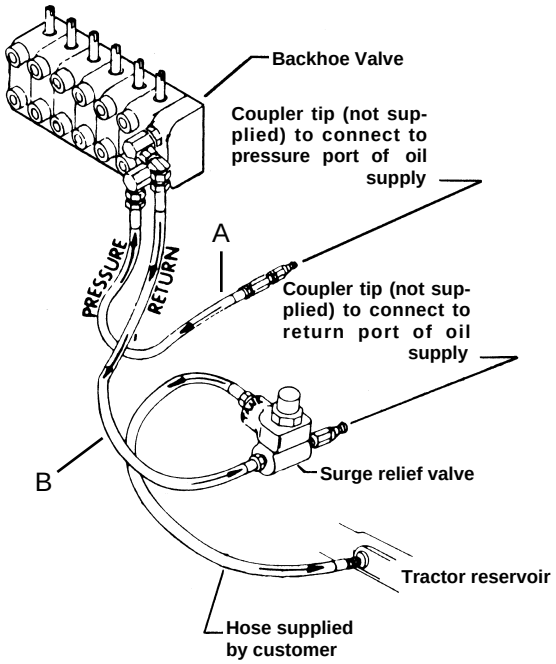



Figure 18



## Hydraulic Hook-Up (865H & 965H)
**For Tractors With Closed-Center Hydraulic Systems**

There are two basic types of hydraulic systems, open-center and closed-center. The open-center system constantly pumps oil through the hydraulic cylinder operating valves and returns the oil to the reservoir. The closed-center system does not pump oil until there is a demand for oil from one of the hydraulic cylinders.

In this case, CLOSED-CENTER means that when the operating valves which control the hydraulic cylinders are in the neutral position, there is no flow of oil through the valves. As long as the engine and pump are running, a constant stand-by oil pressure of approximately 2000 PSI or more is maintained in the system. Pressure oil is available instantaneously to go to work when any one of the operating valves is opened.

Because there must be no flow through the backhoe control valve, when the levers are in neutral position, the backhoe must be converted for closed-center operation.

## Hook-Up Requirements

The hook-up of the 865H & 965H Backhoes to the closed-center system requires more than connecting it to the remote couplers. The required devices are:

1. A flow restrictor in the pressure line to keep the speed of the backhoe operation within safe and acceptable limits.

2. A main relief valve in the backhoe control valve with a pressure setting that is always higher than the tractor system pressure.

3. A closed-center plug in the backhoe control valve to make it a non-circulating or a demand type system.

4. **A low pressure surge relief valve in the return line to keep the tractor back pressure surges from damaging the backhoe control valve seals or tractor system.** A surplus flow line from the relief valve carries only the excess surge oil directly back to the tractor hydraulic reservoir so that it bypasses all other tractor functions.

## Backhoe Operation

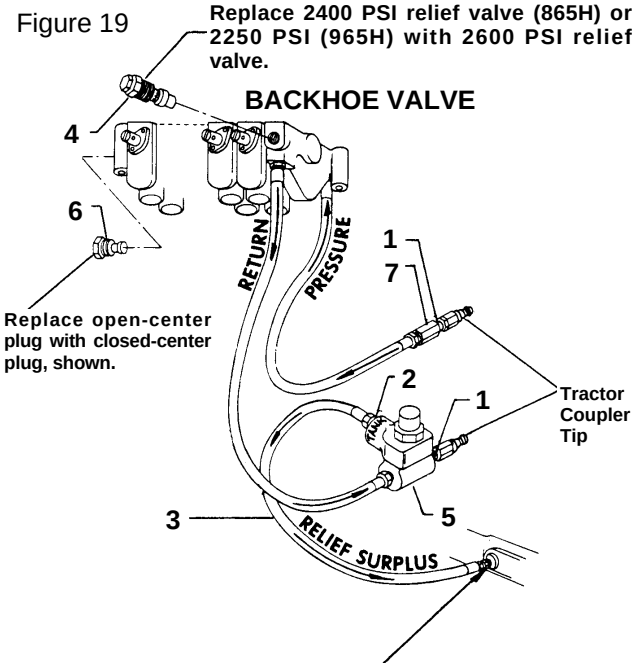
For the most part, a backhoe will function about the same whether it is powered by an open-center or closed-center hydraulic system. However, there are some differences which the operator should be aware of.

As a backhoe function (lifting, actuating the bucket to fill it, etc.) becomes increasingly difficult and the hydraulic system pressure is rising closer to its maximum setting, there will be a noticeable slow down before stoppage occurs. As the system pressure is approaching maximum, the pump is also beginning to stroke back for less and less fluid delivery. At maximum pressure, the pump is completely destroked and there is no delivery.

Therefore, when working various backhoe functions at near maximum ability, it will give the operator the impression that the backhoe is sluggish and somewhat unresponsive. Learning to ease up slightly at the first indication of slow down will permit the backhoe to perform at continuing maximum speed and efficiency.

## Hook-Up Diagram

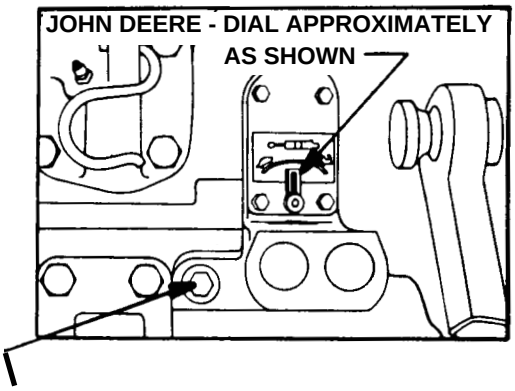
Figure 19




For John Deere Tractors use reservoir plug. Remove plug, drill with 37/64 drill, and tap 3/8 NPT pipe. Screw plug onto hose, locking with Locktite to assure assembly will remain together during connecting and disconnecting procedures. Obtain another plug from your dealer to use when backhoe is removed.

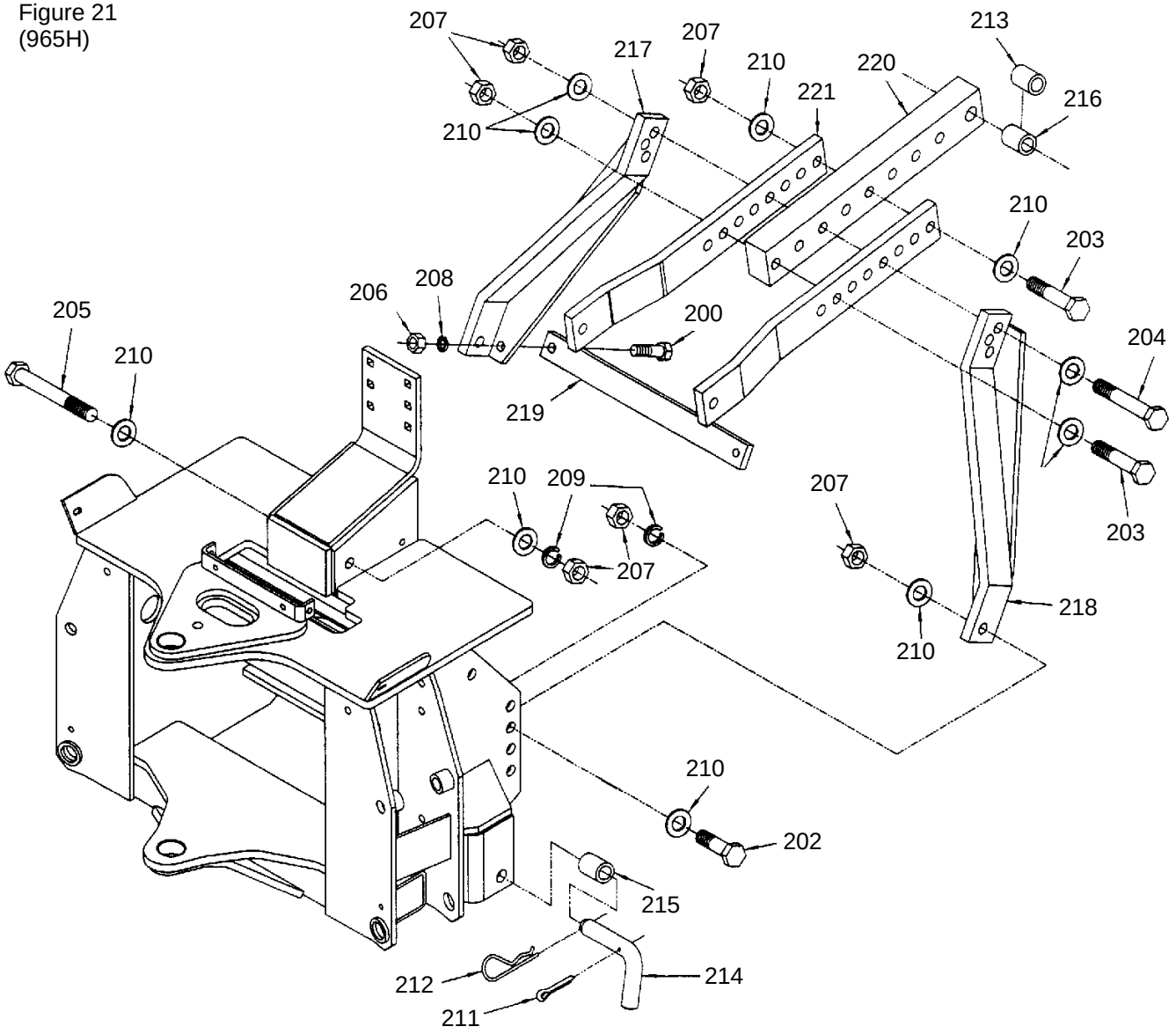
For other tractor makes, use filler plug, drain plug, or any other port that goes directly into the hydraulic reservoir. Do not rely only on the remote coupler return.

Figure 20




Typical plug for surplus relief flow line. Check carefully that it enters the reservoir before using. Note that the location varies with different tractor makes and models. A John Deere Tractor is shown.

Figure 21
(965H)




# ATTACHING KIT INSTRUCTIONS (For 965H)

## 3-POINT HITCH LINKAGE & HYDRAULIC HOOK-UP TO TRACTOR HYDRAULIC SYSTEMS

### General Description

Mounting and hydraulic kits include two hoses which can be used in connecting the backhoe control valve to the tractor hydraulic system. Additional hydraulic components or kits will be required to complete the hook-up to the tractor hydraulic system. Refer to "Hydraulic Hook-Up" section for further information. Pump and reservoir kits are available as options.

The backhoe is mounted on the tractor lower link arms and an adjustable upper link is supplied to replace the tractor upper link. A set of stabilizer arms are included. They bolt from the adjustable upper link to the backhoe mainframe, locking the hoe rigidly in one position.

***IMPORTANT- Tractor lower links must be kept free of lifting forces at all times, after installation of the attaching kit, by keeping tractor quadrant lever in the lowered position.***

*IMPORTANT: If the 3-Point Kit is to be used with a PTO & Reservoir Kit, the Reservoir Tank and it's fittings should be installed before proceeding with the 3-Point installation.*

## ASSEMBLY (Refer to Figure 21 & 22)

*IMPORTANT: Tighten all hardware to the torque requirements specified in the torque chart.*

**⚠ WARNING ⚠**

**TO PREVENT BODILY INJURY, DO NOT OPERATE BACKHOE UNLESS LOWER LINK WELDMENTS (217,218) ARE PROPERLY INSTEALLED AND ADJUSTED. FAILURE TO DO SO MAY RESULT IN BACKHOE BEING THRUST UPWARD, CRUSHING OPERATOR AGAINST CAB OR ROPS.**

1. Use hoist to raise the backhoe mainframe so that the boom pivot pin is approximately 16" off the ground.

2. Back tractor close to the backhoe. Connect tractor lower link arms to lower link mounts at position "C", Figure 22, using two L-pins (214), two cotter pins (211), and two wire form cotter pins (212) as shown in Figure 21.

*NOTE: If tractor has a category II hitch, install two bushings (215) in lower link arms as shoen in Figure 21.*

3. Attach upper braces (221), Figure 21 to backhoe with 3/4 x 7-1/2" bolt (205), lockwasher (209), flat washers (210) and nut (207). Do not tighten hardware at this time.

4. Install bushing (213) or bushing (216) in the hole of the upper bar (220) that most closely matches the diameter of the tractor upper link pin, as shown in Figure 21. No bushing is necessary for Category II tractors.

5. Secure upper bar (220) between upper braces (221) using 3/4 x 5" bolts (203), flat washers (210), and nuts (207). Use hoist to raise or lower backhoe slightly until a hole in the upperr bar aligns with a hole in the upper braces. See Figure 21.

6. Attach RH lower link weldment (217) and LH lower link weldment (218) to backhoe mainframe using 3/4 x 2-1/2" bolt (202), flat washer (210), and nut (207). See Figure 21.

7. Align RH and LH link weldment (217, 218) with a hole in the upper bar/brace assembly, as close to the tractor as possible. Use 3/4 x 6-1/2" bolt (204), flat washer (210), and nut (207). See Figure 21. You may need to return to Step 6 and readjust upward or downward the bolt connection.

8. Remove backhoe from the tractor.

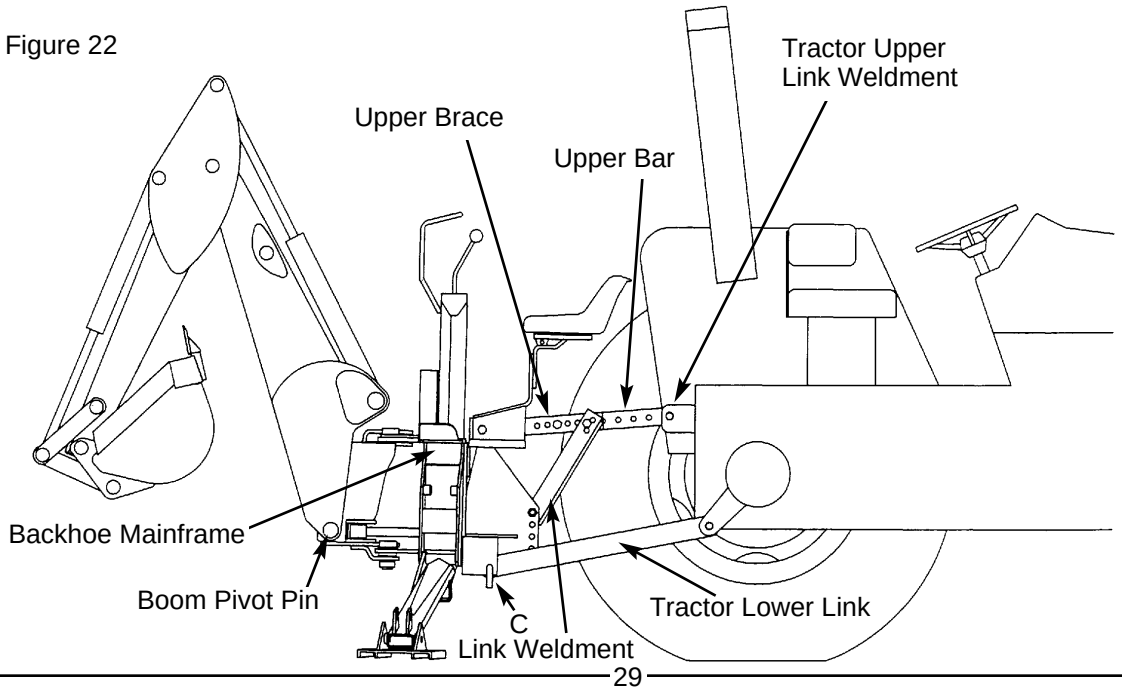
9. Install connector plate (219) to RH and LH lower link weldments (217, 218) using 5/8 x 2" bolt (200), lockwasher (208), and nut (206). See Figure 21.

10. Tighten all hardware at this time. Check your installation very carefully to be sure all members are correctly installed and securely fastened.

10A. If using optional PTO Pump and Reservoir Kit proceed to that section prior to remounting the backhoe onto the tractor.

11. Connect hoses from the backhoe control valve to the tractor hydraulic system as described in "Hydraulic Hook-Up" section, pages 25-27, prior to remounting the backhoe onto the tractor.

Figure 22



# TORQUE VALUES

Common bolts and nuts — Tightening Torque Plus/Minus 20%

| Size | Grade 2 | Grade 5 | Grade 8 |
|---|---|---|---|
| 1/4-20 NC | 70 in. lbs. | 115 in. lbs. | 165 in. lbs. |
| 1/4-28 NF | 85 in. lbs. | 140 in. lbs. | 200 in. lbs. |
| 5/16-18 NC | 150 in. lbs. | 250 in. lbs. | 350 in. lbs. |
| 5/16-24 NF | 165 in. lbs. | 270 in. lbs. | 30 ft. lbs. |
| 3/8-16 NC | 260 in. lbs. | 35 ft. lbs. | 50 ft. lbs. |
| 3/8-24 NF | 300 in. lbs. | 40 ft. lbs. | 60 ft. lbs. |
| 7/16-14 NC | 35 ft. lbs. | 55 ft. lbs. | 80 ft. lbs. |
| 7/16-20 NF | 45 ft. lbs. | 75 ft. lbs. | 105 ft. lbs. |
| 1/2-13 NC | 50 ft. lbs. | 80 ft. lbs. | 115 ft. lbs. |
| 1/2-20 NF | 70 ft. lbs. | 105 ft. lbs. | 165 ft. lbs. |
| 9/16-12 NC | 75 ft. lbs. | 125 ft. lbs. | 175 ft. lbs. |
| 9/16-18 NF | 100 ft. lbs. | 165 ft. lbs. | 230 ft. lbs. |
| 5/8-11 NC | 110 ft. lbs. | 180 ft. lbs. | 260 ft. lbs. |
| 5/8-18 NF | 140 ft. lbs. | 230 ft. lbs. | 330 ft. lbs. |
| 3/4-10 NC | 150 ft. lbs. | 245 ft. lbs. | 350 ft. lbs. |
| 3/4-16 NF | 200 ft. lbs. | 325 ft. lbs. | 470 ft. lbs. |

Note - See tractor instruction manual or your tractor dealer for tightening of metric bolts.

# POWER BEYOND KITS

## FOR TRACTORS WITH OPEN-CENTER HYDRAULIC SYSTEMS

### General Description

A power beyond application is required to convert a hydraulic valve so that pressurized oil can be directed to another “open center” valve. This allows the backhoe valve and a loader valve, or other accessory, to be connected to the tractor hydraulic system simultaneously, without the inconvenience of using a flow diverting valve.

Since the power beyond application is only required on “open center” hydraulic systems, oil will be constantly flowing from the pump through the backhoe and loader or other accessory valve, and then back to the reservoir. “Open center” refers to this constant flow through the open center of the valves.

The assembly instructions cover two conditions that require a power beyond kit to be ordered from Bush Hog. The first procedure shows the recommended method of connecting a Bush Hog loader with a Bush Hog valve to a Bush Hog backhoe. The second procedure shows the recommended method for connecting a Bush Hog backhoe and a competitive loader or a non Bush Hog valve. The second is also used to operate the backhoe and loader off the backhoe PTO pump kit option. The power beyond plug is included with the loader valve when the valve is ordered. The second procedure requires the power beyond kit for the backhoe valve be ordered from Bush Hog as a separate item.

The hoses and fittings required in either procedure to connect the two valves together are not supplied. The proper fittings and hose lengths required must be determined for each specific application. The parts must be supplied by the customer.

#### Tractor Preparation

Stop tractor, lower all attachments to the ground, and relieve pressure in all hydraulic lines by moving all control handles back and forth or side to side several times.

#### Backhoe Preparation

1. Remove shroud covering valve hydraulic fittings.

*Note: The terms RIGHT and LEFT for all adapter parts are determined from the position of the operator when seated in the operating position on the backhoe.*

2. Carefully clean the top and right side of the backhoe control valve and remove the “conversion” plug located in the center of the right side of the valve.

*Note: If there are two plugs in this area, the conversion plug is the larger plug located lower on the right side of the valve.*

## ASSEMBLY OF A BUSH HOG BACKHOE TO A BUSH HOG LOADER VALVE

*IMPORTANT: Improper hydraulic hook-up can cause serious damage to backhoe control valve or other hydraulic components. Refer to the Bush Hog loader Operator's Manual during this procedure.*

When connecting the Bush Hog backhoe valve to a Bush Hog front end loader valve, the input pressure line from the tractor will be connected to the loader valve first. The power beyond pressure line will be connected to the input pressure port of the backhoe valve. In order to properly plumb the system, the loader valve will require converting to a power beyond valve. Refer to the Operator's Manual received with the loader for the proper assembly of the power beyond valve.

There have been several different valves used on the loader in past years. The fittings required to convert the Bush Hog loader valve to a power beyond application are included in the loader valve kit. If the fittings (or plugs) cannot be located, they can be obtained from Bush Hog Service Parts. Before attempting to order the plug you must first determine the manufacturer of the loader valve assembled to your loader. This can be determined from the identification plate located on the valve.

1. Install the power beyond plug received with the loader valve into valve cavity as shown in Figure 23 (Page 32). Make sure O-rings on sleeve are positioned properly and are not pinched or damaged.

2. Install a pressure line (supplied by customer) between the tractor pressure "out" port and the pressure inlet port of the loader valve.

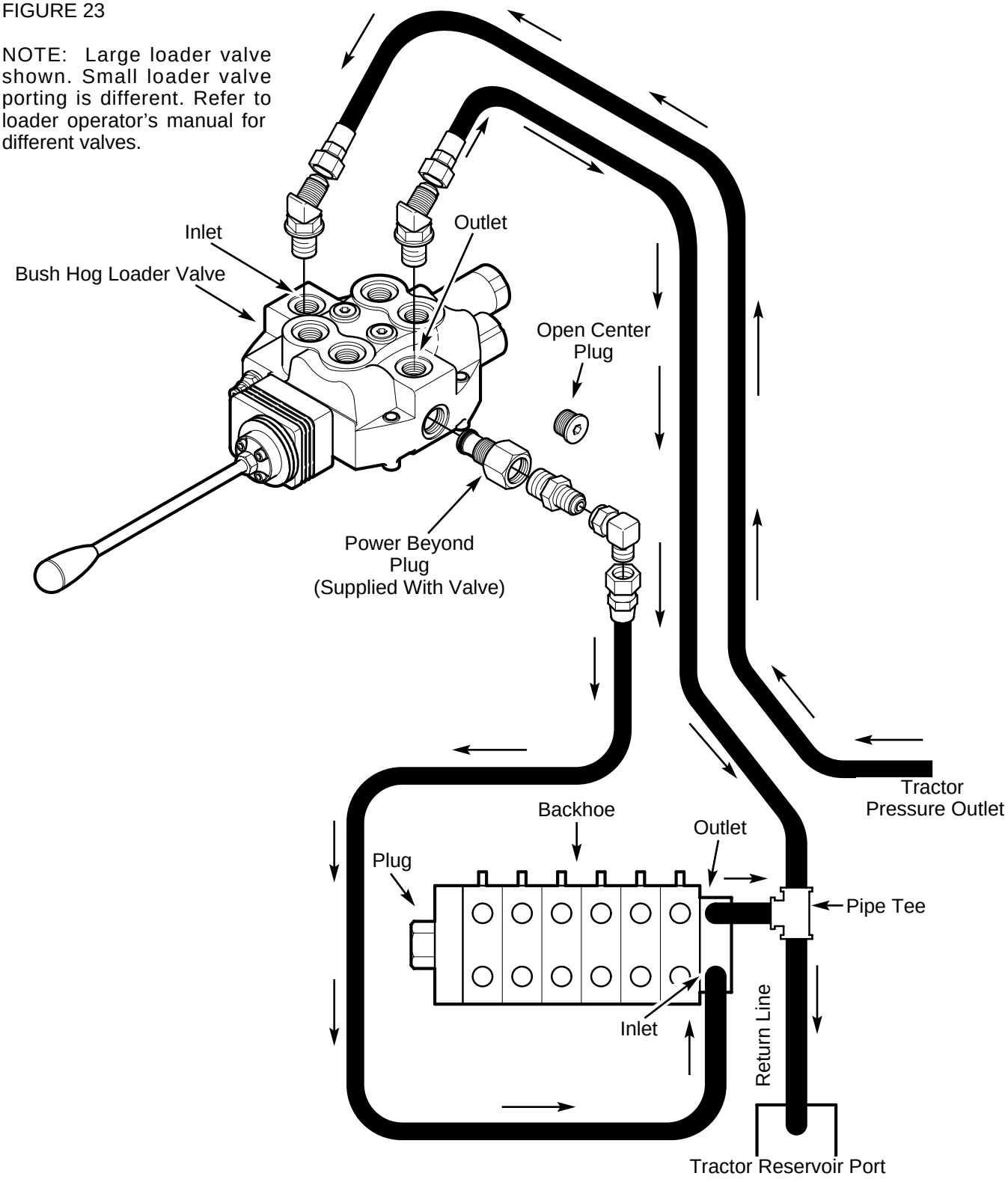
3. Install a pressure line (supplied by customer) between the power beyond fitting of the loader valve and the pressure inlet port of the backhoe valve as shown in Figure 23.

4. Complete assembly of "return" hoses as shown in Figure 23. Connect return hoses from both valves to tee as shown. Hoses and tee supplied by customer. Connect the return line directly to a port on the tractor reservoir as shown in Figure 23.

## BUSH HOG BACKHOE & BUSH HOG LOADER VALVE

FIGURE 23

NOTE: Large loader valve shown. Small loader valve porting is different. Refer to loader operator's manual for different valves.




**IMPORTANT: Never connect the return hose to a tractor remote coupler which can be pressurised. Accidental pressurization can cause serious damage to backhoe valve.**

## ASSEMBLY:

### BUSH HOG BACKHOE AND A NON BUSH HOG LOADER - OR - BUSH HOG BACKHOE AND LOADER USING PTO PUMP KIT OPTION

*IMPORTANT: Improper hydraulic hook-up can cause serious damage to backhoe control valve or other hydraulic components.*

The following instructions are to be used to connect the backhoe valve in line with a front end loader valve that is not a Bush Hog loader valve. When connecting the Bush Hog backhoe valve to a loader valve other than one obtained from Bush Hog, the input pressure line from the tractor will be connected to the backhoe valve first. In order to properly plumb the system, the backhoe valve will require converting to a power beyond valve. The power beyond pressue line from the backhoe valve will be connected to the input pressure port of the loader valve. The power beyond kit for the backhoe being assembled must be ordered as a separate item from Bush Hog.

**Assembly**

***IMPORTANT: Improper hydraulic hook-up can cause serious damage to backhoe control valve or other hydraulic components.***

1. Install power beyond sleeve (1) into valve cavity, as shown in Figure 24 (Page 33), making sure that O-rings and back-up ring on sleeve are positioned properly and are not pinched or damaged.

2. **665H and 765H -** Assemble 90 degree O-ring adapter union (2) to power beyond sleeve (1) and direct fitting down through notch in Right Hand foot pad.

**865H & 965H -** Assemble straight O-ring adapter union (3) to power beyond sleeve (1). Install 90 degree pipe threaded adapter union (2) into adapter union (3).

3. Assemble hydraulic hose (supplied by customer) to adapter union (2) as shown in Figure 24. Hose should have same pressure rating as original pressure hose to loader or other accessory valve.

4. Install hose sleeve (4) onto hose assembled in step 3. Position hose sleeve to completely cover adapter union (2) and secure with plastic tie (8) as shown in Figure 24.

**⚠ CAUTION ⚠**

***Hose sleeve (4) is installed to help protect the backhoe operator from escaping fluid under pressure. If it becomes damaged or lost, replace hose sleeve (4) and plastic ties (8) immediately.***

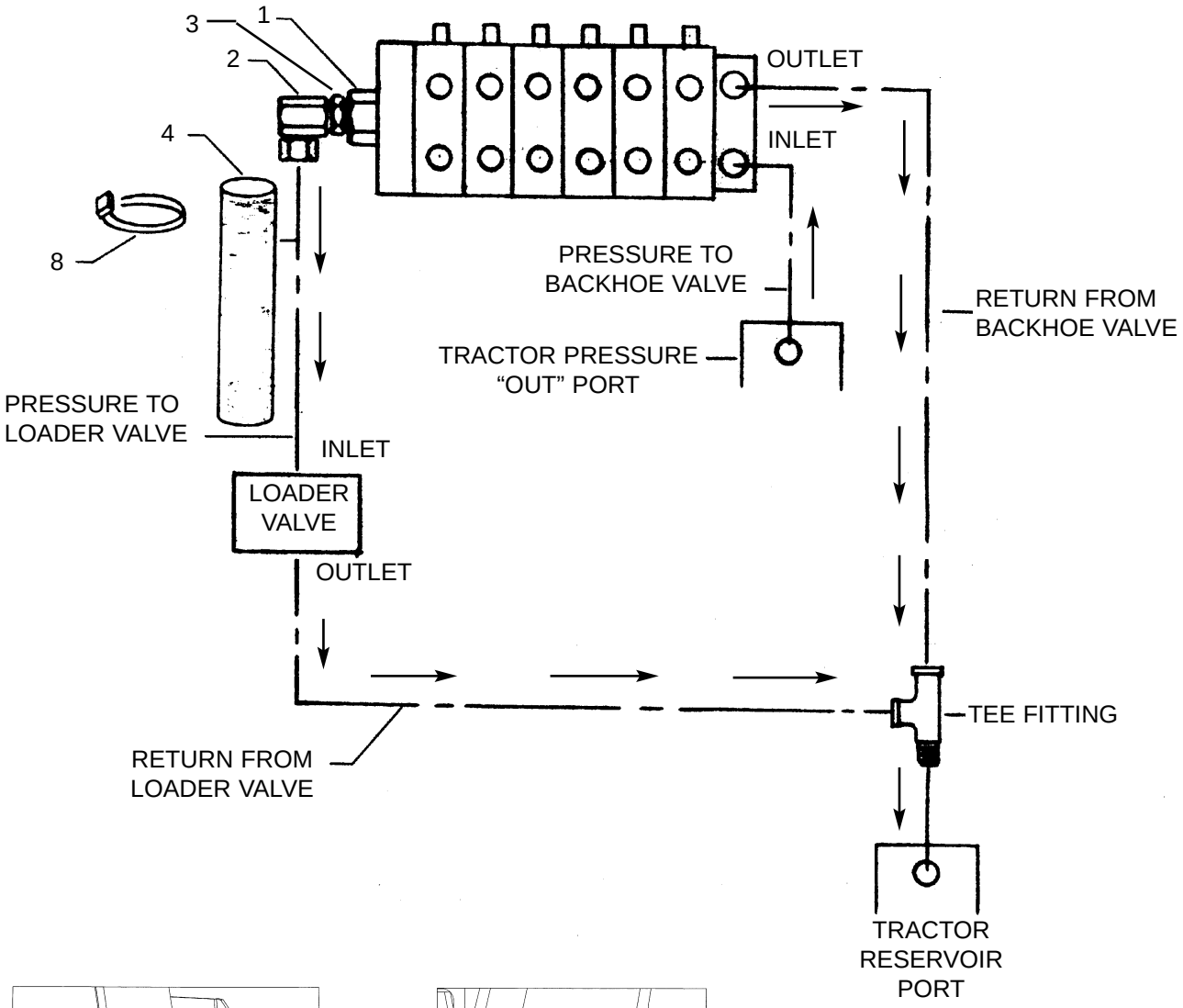
5. Assemble hydraulic hose (see step 3) from backhoe power beyond port to loader or accessory valve inlet port using fittings (supplied by customer) as needed. Refer to Figure 24.

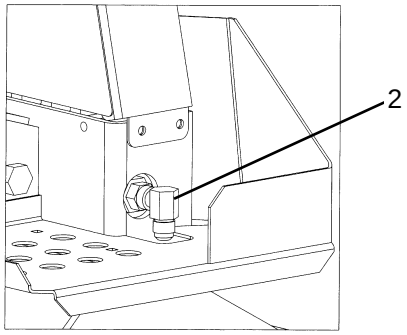
6. Complete assembly of backhoe “pressure” and “return” hoses as shown in Figure 24 using hoses and tee fitting (supplied by customer).

7. Complete assembly of loader “return” hose to tee fitting as shown.

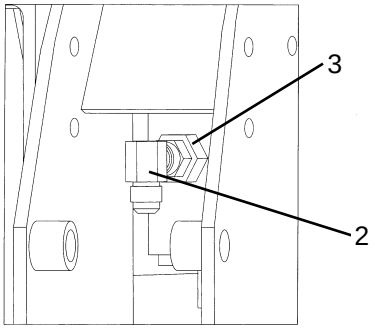
8. Replace shroud using hardware removed in step 1 of “Backhoe Preparation” section.

Figure 24




**662H & 762H BACKHOES**




**862H & 962H BACKHOES**

# PTO PUMP AND RESERVOIR KIT (Optional)

## General Description

The PTO Pump Kit consists of those parts required to power the backhoe from the tractor's PTO shaft. It includes the PTO pump and adapter, reservoir, filtration system, hydraulic hoses and fittings. In addition, it includes a pump plate which attaches to the tractor's draw bar and keeps the pump from turning with the PTO shaft.

*Note: The speed of the backhoe operation increases as PTO speed increases.*

## Assembly

***Note: When installing hoses and fittings always use thread sealant in permanent connections. Do not use thread sealant in union ends of adapters. Do not overtighten fittings - they can split or expand, causing leakage.***

1. Assemble filler tube (19) and breather cap with dipstick (18) to reservoir (16) as shown in Figure 25 & 26.

2. Assemble reservoir (16) to backhoe using locknuts (3) as shown in Figures 25 & 26.

3. Preassembly of filter base and element (22):

Remove filter element from base to ease installation. Assemble pipe nipple (26) to inlet port on filter base (22) as shown in Figures 25 & 26.

Assemble 90 degree adapter union (5) to Outlet port on filter base (22) as shown in Figures 25 & 26.

4. Assemble filter base (22) to reservoir (16) using 90 degree pipe elbow (28 or 29) as shown in Figures 25 & 26.

***NOTE -*** *Change filter element (11) every time oil is changed.*

5. Assemble suction hose (23) to straight beaded fitting (21) using hose clamp (24). Connect assembly to 90 degree adapter union (5) located on filter base and element (22) as shown in Figures 25 & 26.

6. Connect 15" long return line hose (17) to steel oil line coming from the "OUT" port on backhoe control valve as shown in Figures 25 & 26.

7. Complete return line connection to reservoir (16) using pipe bushing (6), and 90 degree adapter union (12) as shown in Figures 24 & 25. Reinstall filter element to filter base (22)

8. Assemble Pump Plate (27) to pump (10), using hardware provided (1, 4, 7), as shown in Figures 25 & 26. Pump Plate may have to be readjusted later.

9. Slide PTO adapter (15) onto pump shaft allowing 1/8 inch between adapter and pump face and secure with two setscrews (9), as shown in Figures 25 & 26, lock with two nuts (2).

10. **4.5 GPM PTO PUMP KIT -**

Assemble suction hose (23) to pump (10), using reducer (14), 90 degree beaded fitting (20), and hose clamp (24) as shown in Figure 25.

**6.1 GPM PTO PUMP KIT -**

Assemble suction hose (23) to pump (10), using reducer (28), reducer (14), 90 degree beaded fitting (20), and hose clamp (24) as shown in Figures 26.

11. **4.5 GPM PTO PUMP KIT -**

Connect 36" long pressure line (25) to steel oil line coming from the valve "IN" port fitting. Complete connection to pump using 90 degree adapter union (13) as shown in Figure 25.

**6.1 GPM PTO PUMP KIT -**

Connect 36" long pressure line (25) to steel oil line coming from the valve "IN" port fitting. Complete connection to pump usign 90 degree adapter union (12) and reducer (13) as shown in Figures 26.

***IMPORTANT*** - If hoses are hooked up incorrectly, serious damage to the backhoe valve will result.

12. NOTE: Initial fill up of the Reservoir Tank will require 4-1/2 gallons of fluid. Fill reservoir with recommended fluid to correct level, referring to Service Section in the Backhoe Manual.

13. Mount the backhoe to the tractor at this time following the procedure in the Attaching Kit Manual.

14. Slide complete pump assemble onto the PTO shaft and secure with lock pin on PTO adapter. Be sure kinks do not develop in any of the lines. Suction hose can be shortened to prevent this problem.

**⚠ CAUTION ⚠**

DO NOT REMOVE THE TRACTOR PTO GUARD

15. Pump Plate (27) may be adjusted (flipped front to back or bottom to top) on pump (10) for proper fit-up to tractor drawbar or three point mount if necessary. The optimum position is to have the plate pointing down and over the drawbar with the offset towards the tractor. (Refer to illustration on following page)

An alternate position for the pump plate may have it pointed upwards and retained by the Upper Bar of the 3-Point Mount Kit. Whatever position is used by the Pump Plate, it is important that the pump be restrained from rotating. (Refer to illustration on following page)

***IMPORTANT -*** When mounting backhoe on the adapter, do not let the swing cylinders interfere with the backhoe pump, or the hydraulic lines become tangled in any part of the adapter during installation. Make sure both pressure and suction lines are free from kinks or twists to reduce back pressure and excessive heat built-up.

Figure 25
**4.5 GPM PUMP KIT**

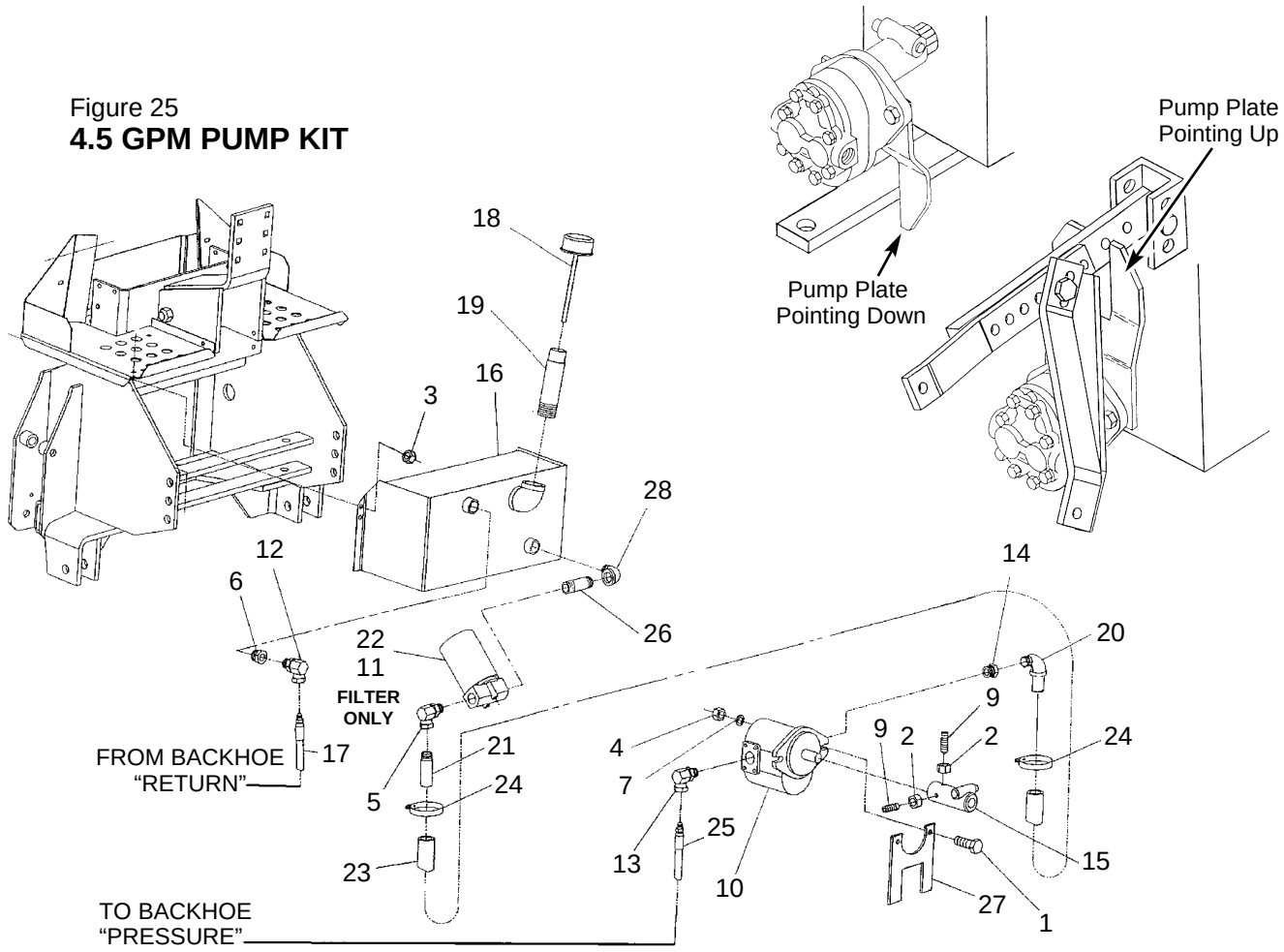
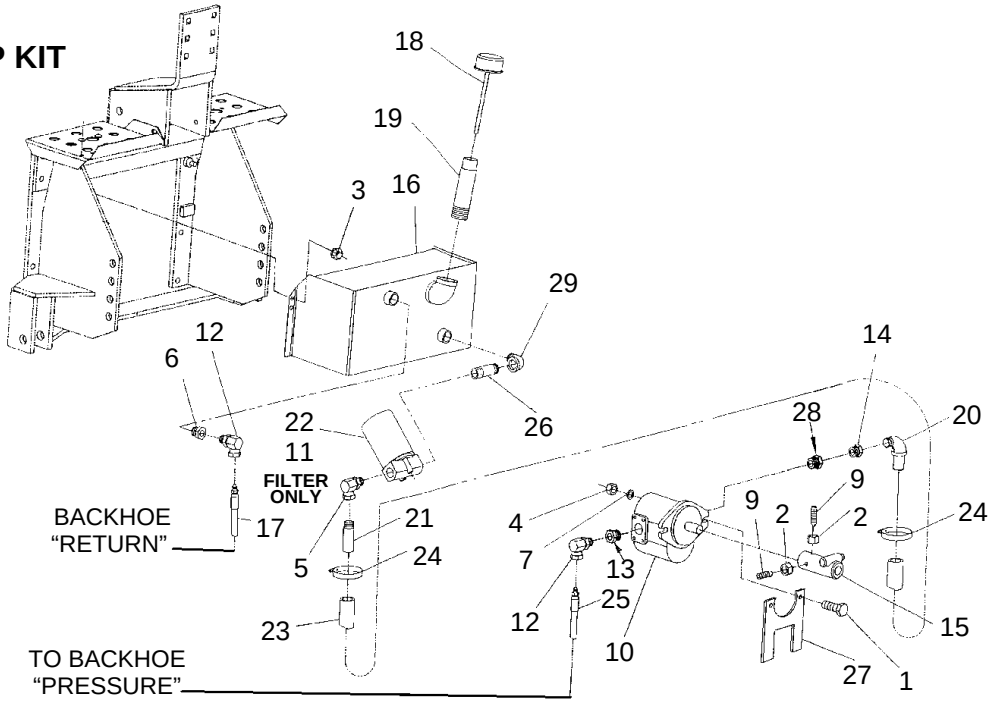
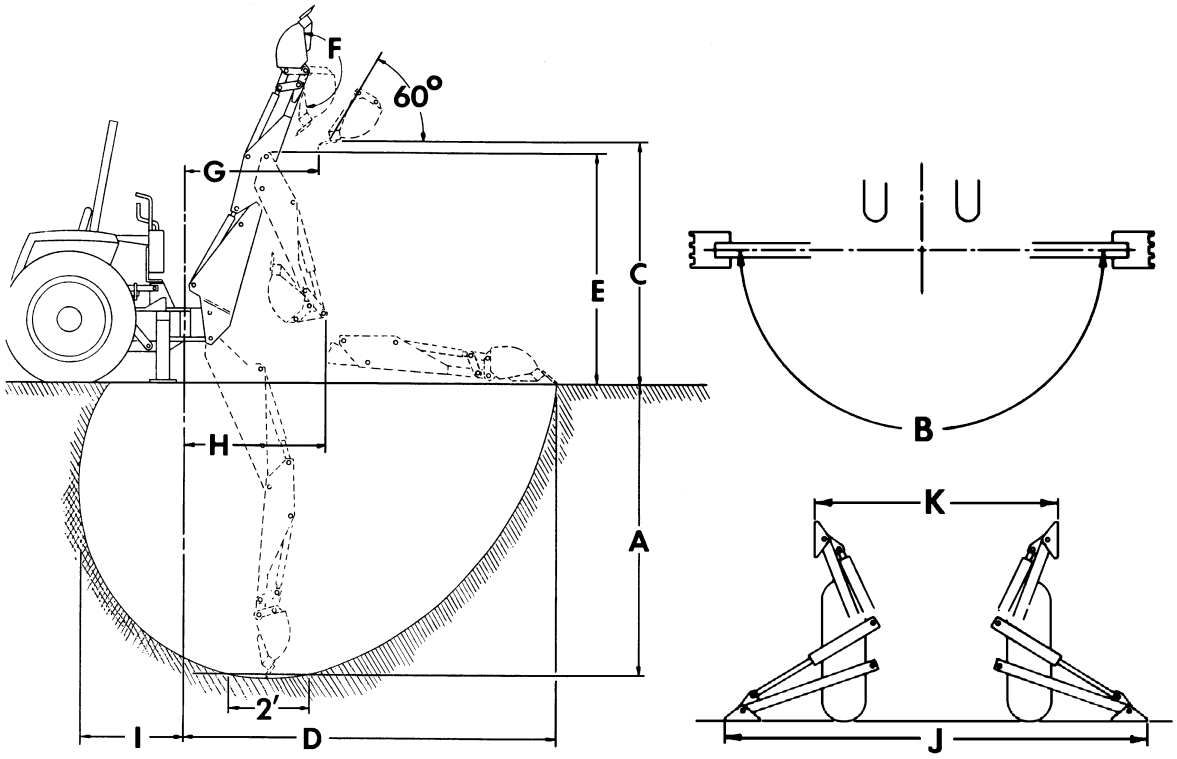



Figure 26
**6.1 GPM PUMP KIT**



## BACKHOES - DIMENSIONS AND SPECIFICATIONS

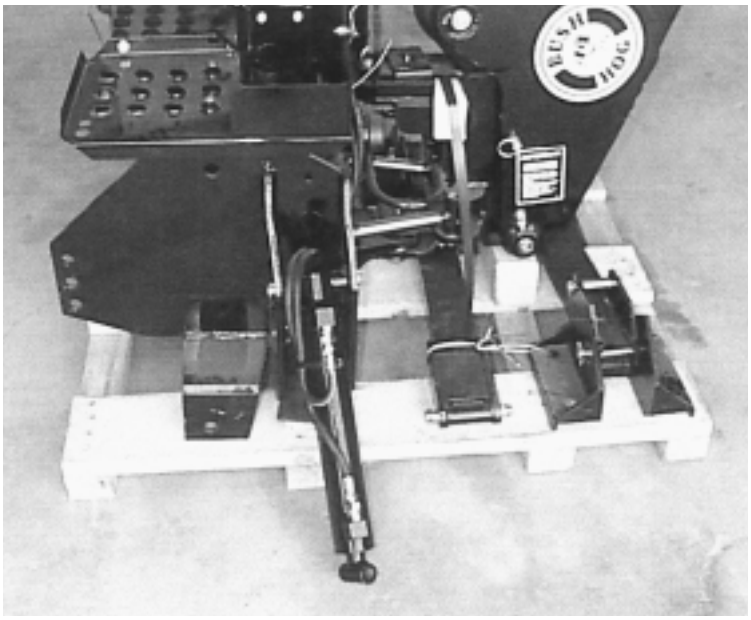



| SERIES | 665H | 765H | 865H | 965H |
|---|---|---|---|---|
| **Maximum Digging Depth** | 7'0" | 8'0" | 9'0" | 10'1" |
| **A. Digging Depth (two foot flat bottom)** | 6'6" | 7'6" | 8'6" | 9'7" |
| **B. Swing Arc** | 180° | 180° | 180° | 180° |
| **C. Loading Height (bucket at 60°)** | 5'0" | 5'10" | 6'10" | 7'8" |
| **D. Reach from Center Line of Swing Pivot** | 8'6" | 9'6" | 11'1" | 12'5" |
| **E. Transport Height (maximum)** | 4'11" | 5'9" | 6'9" | 7'10" |
| **F. Bucket Rotation** | 180° | 180° | 180° | 180° |
| **G. Loading Reach (bucket at 60°)** | 3'2" | 3'7" | 3'7" | 4'11" |
| **H. Transport Overhang** | 3'5" | 3'6" | 4'0" | 5'1" |
| **I. Undercut** | 2'4" | 2'6" | 2'10" | 2'11" |
| **J. Stabilizer Spread, down position** | 6'6" | 7'5" | 8'3" | 9'3" |
| **K. Stabilizer Spread, up position** | 3'11" | 5'1" | 4'6" | 6'0" |
| **Bucket Cylinder Digging Force** | 2450 lbs. | 2840 lbs. | 3730 lbs. | 4575 lbs. |
| **Dipperstick Cylinder Digging Force`** | 1250 lbs. | 2005 lbs. | 2435 lbs. | 3175 lbs. |
| **Shipping Weight (less bucket)** | 654 lbs. | 875lbs. | 1040 lbs. | 1620 lbs. |
| **Hydraulic Volume Requirements** | 4 to 5 GPM | 5 to 6 GPM | 5 to 8 GPM | 6 to 9 GPM |
| **Hydraulic Pressure Requirements** | 2250 psi. | 2250 psi. | 2525 psi. | 2400 psi. |
| **Recommended Tractor HP Requirements** | 18 - 35 HP | 25 - 45 HP | 45 - 95 HP | 55 - 100HP |

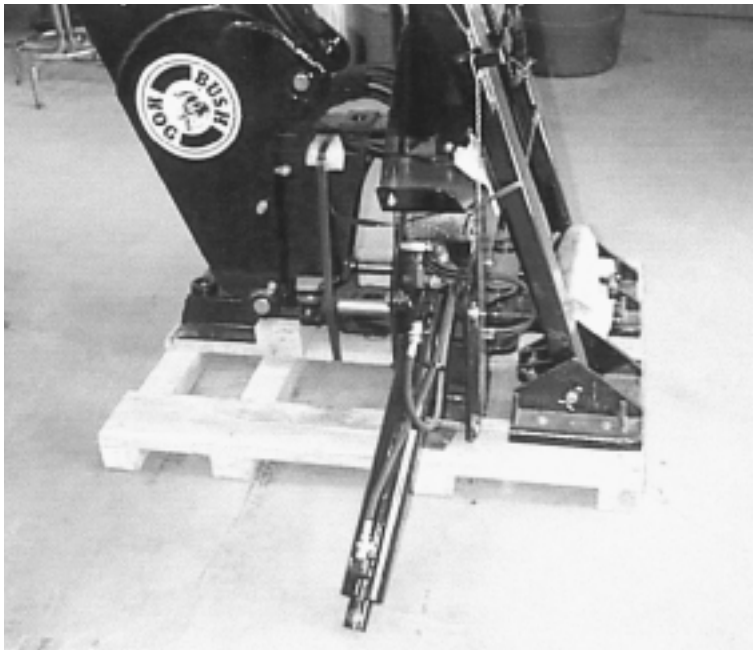
*Specifications May Vary Depending on Tractor Model and are Subject to Change Without Notification. Tractors Must Be Equipped with ROPS and Seat belt That Will Provide Better Safety.*

# REPOSITION STABILIZER CYLINDERS BEFORE REMOVING BACKHOE FROM SHIPPING PALLET

**Cylinder ports must be pointing upward and hoses routed above the cylinder to main-frame pivot pin connection.**



**Models 665H and 765H**



**Models 865H (Shown)**
**&**
**965H**

# NOTICE:

**INSTRUCTIONS FOR MOUNTING BUSH HOG BACKHOES ON SKID STEER LOADERS COME WITH THE INDIVIDUAL MOUNTING KITS. THE EXAMPLE SHOWN BELOW IS A MODEL 865H MOUNTED ON A JOHN DEERE MACHINE.**

# BUSH HOG®, L.L.C.

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**Telephone (334) 874-6960**